THE EFFECT OF A TAX DEDUCTION ON CHARITABLE CONTRIBUTIONS BY LOW- AND MIDDLE-INCOME TAXPAYERS

By

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To my parents and my wife

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The purpose of this study is to answer the following research questions: (1) Is giving by taxpayers in low- and middle-income classes responsive to the deduction incentives provided by tax laws? (2) Does itemization have a significant independent effect on the decision to make a charitable contribution? Since the giving behavior of taxpayers in the above income classes and particularly among nonitemizers is unclear, the identification of differences in responsiveness between taxpayers in different income classes and between itemizers and nonitemizers provides a further step toward the establishment of an efficient and consistent tax policy regarding charitable contributions.

A Simultaneous Equations Tobit model is constructed and analyzed theoretically and empirically. This model explicitly incorporates, in the contribution demand function, the selectivity bias arising from estimating a censored regression and the simultaneous bias due to the dependence of the price of giving on the level of contributions. A two-step estimation technique is used to estimate the price elasticities of giving on samples of taxpayers selected from the 1985 Individual Tax Model File in order to assess the effectiveness of the deduction policy under the Economic Recovery Tax Act of 1981 that allowed tax deductions for charitable contributions by low- and middle-income taxpayers, including nonitemizers.

This study finds substantially high price elasticity estimates for itemizers, but insignificant positive estimates for nonitemizers. The nonitemizers' elasticity estimates are possibly contaminated by the unique and irregular giving behavior of borderline nonitemizers. The switch from a nonitemizer to an itemizer is found to have a significant, positive impact on contributions. However, this finding of an itemization effect must be interpreted with caution because the sample of nonitemizers, which is a control group, includes borderline nonitemizers.

The results of this study suggest that, in general, deduction policy regarding itemizers' contributions effectively attained its goal because itemizers are found to be sensitive to tax incentives in making their contribution decisions regardless of income class. However, deductions for nonitemizers' giving provided a windfall tax benefit to nonitemizers and induced many high-income taxpayers to switch their itemization status to nonitemizers.

CHAPTER 1
INTRODUCTION

1.1 Overview

Since 1917 when Congress chose to allow individual taxpayers a deduction for charitable contributions, considerable controversy has surrounded the role of the charitable contribution deduction in encouraging donations among Americans.[1] In particular, a great deal of political and academic attention has focused on the existence and size of the effect of a tax deduction for contributions made by individuals. There is a general consensus based on empirical research that there is a relatively high incentive effect of deductions for charitable contributions on high-income taxpayers.[2] For contributions by low- and middle income taxpayers, however, two contradictory views have long vied for the attention of tax policymakers.

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[1] In 1986, Americans contributed $87.22 billion to charity (up more than 80% over 1980 and 9.4% over 1985), an average of $360 per person. Individual donors accounted for 82% of this giving in 1986, representing 2.06% of personal income. See Giving U. S. A. (American Association of Fund-Raising Counsel, Inc., 1987, pp. 18-21). This annual publication is one of the most widely-cited sources of data on charitable contributions. Also it is estimated that the total giving in 1988 amounted to an all-time high of $104.04 billion.

[2] Clotfelter [1985a] presents a fairly complete table summarizing econometric studies of individual contributions. See pp. 57-59 and 67. See also Clotfelter and Steuerle [1981].

One view is that taxpayers in low- and middle-income classes are also quite responsive to the tax incentives for contributions (e.g., see Feldstein [1975] and Boskin and Feldstein [1978]). Advocates of this view have argued for a tax policy that would encourage contributions among taxpayers in these income classes by extending the charitable contribution deduction to nonitemizers (e.g., Commission on Private Philanthropy and Public Needs [1977] and Feldstein and Lindsey [1980]). The prevalence of this view prompted Congress to respond to the arguments by allowing nonitemizers to deduct their gifts under the direct charitable deduction (DCD) provisions of the Economic Recovery Tax Act of 1981 (ERTA '81).[3] Prior to 1982 only

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[3] Sections 63(i) and 170(i) of the Internal Revenue Code of 1954 (All code references are to the Internal Revenue Code of 1954 unless otherwise indicated). The terms 'charitable contribution deductions for nonitemizers,' 'above-the-line charitable contribution deduction,' and 'direct charitable deduction (DCD)' are used interchangeably in the context of a charitable deduction for nonitemizers as provided in the Section 170(i). Per Section 170(i), a direct charitable deduction as defined under Section 63(i) was to be phased in over the five-year period 1982 through 1986 as follows:

Year	Percentage of contribution allowed as deduction	Ceiling on allowable amount of contribution
1982	25	$100
1983	25	100
1984	25	300
1985	50	No limitation
1986	100	No limitation

those individuals who itemized their deductions could claim a deduction for charitable contributions; this restriction precluded many low- and middle-income taxpayers from deducting their charitable contributions.

Proponents of the other view contended that there was little if any incentive effect for the charitable contribution deduction on giving, especially at low- and middle-income levels (see Kahn [1960, p. 72] and Aaron [1972, p. 211]) and, therefore, the above-the-line deduction under the DCD provisions would induce a smaller increase in giving than the associated revenue loss (Auten and Rudney [1984]). This view is evidently reflected in the related provisions of the Tax Reform Act of 1986 (TRA '86) that denied the deduction for contributions made by nonitemizers.[4] Not surprisingly, the old debate on the incentive effect of the charitable contribution deduction rekindled as charities and economists predicted a substantial decrease in charitable giving (e.g., Clotfelter [1985b], American Association of Fund-Raising Counsel [1987, p. 23]).

The ceiling limitation is not doubled for a married person filing a joint return.

[4] See Section 170(i)(4).

1.2 Purpose and Motivation of the Study

As was noted above, the DCD provisions were enacted in 1981 in order to encourage charitable contributions among taxpayers in low- and middle-income classes. If low- and middle-income taxpayers, in fact, are responsive to the tax incentives of the above-the-line deduction, it is logical to anticipate that their contributions will increase by more than the associated revenue loss. The underlying assumption of this anticipation is that taxpayers are sensitive to the incentives in making their contribution decisions. Such a high sensitivity to taxes when making contribution decisions is sufficient evidence to support a conclusion that the policy objective of the above-the-line deduction was achieved.

Normally, the sensitivity of contributions to taxes is expressed in terms of the price elasticity of giving which measures the proportionate change in charitable contributions as a result of a proportionate change in the price of giving (or the net after-tax cost of giving). This study will estimate the price elasticities of giving in order to assess the responsiveness of charitable contributions made by low- and middle-income taxpayers to the tax incentives that were provided by the deduction rules under ERTA '81. Specifically, this study explores the behavioral relationships between the amount of charitable

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contributions that were made and its determinants to estimate the price and income elasticities of demand for contributions.

The results of this study will be useful for four reasons. First, it appears that one major objective of a tax policy that allows a deduction for charitable contributions is to encourage donations by providing donors with tax incentives to give. However, the effect of such a tax incentive on contributions by low- and middle-income taxpayers is not clear. The results of previous empirical studies are mixed, leaving considerable uncertainty in this area of econometric study.[5] Differences across studies in model specifications, estimation techniques, and ways of measuring variables may be responsible for the mixed results, along with a variety of data sets and time periods. The contradictory findings reported in these empirical studies call for a further examination of this area of research. This study is an attempt to provide for a reconciliation of these differences by employing more precise information about charitable contribution deductions claimed by low- and middle-income taxpayers and by using more refined statistical tools.

Second, although the DCD provisions were enacted specifically to encourage charitable giving by taxpayers in low- and middle-income classes, they were designed to expire at the end of 1986. In this sense, the provisions had been enacted for experimental purposes during the ERTA years. This study will provide evidence as to the propriety of the tax policy regarding nonitemizers' charitable contributions by evaluating the results of Congress' experiment with actual tax return data.

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[5] See Clotfelter [1985a, pp. 56-58, Table 2.12] for a comprehensive review of this line of literature.

Third, modern public finance theory has established a tradition of evaluating a public policy decision based on the criteria of economic efficiency and distributional equity. In evaluating a tax policy for charitable giving, efficiency is measured by the size of the tax incentives for giving.[6] The incentive effects are measured by the ratio of increased contributions to forgone revenue. A deduction scheme affects various parties (e.g., taxpayers, charitable organizations, and government) differently depending on the responsiveness of contributions to tax incentives (i.e. whether charitable contributions are in fact price elastic). Therefore, the results of this study on the price elasticity of giving will give an insight into whether the policy goal behind extending the deductibility of contributions to nonitemizers was attained.

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[6] This is a quite narrow definition of efficiency that is developed without taking into consideration the externalities of contributions. See Clotfelter [1985a, pp. 281-284] for a brief discussion of this issue. See also Feldstein [1980] for the analysis and comparison of the welfare cost of a tax subsidy with that of direct government spending within the context of an economy of identical individuals.

Finally, the empirical results of this study may have implications regarding distributional equity. Since the tax savings per dollar contributed rises with a taxpayer's marginal tax rate, the charitable contribution deduction has often been criticized for its favoritism toward high-income taxpayers (see McDaniel [1972], and Nielson [1979, p. 16]). If low- and middle-income taxpayers have the same sensitivity to taxes as do high-income taxpayers, the distributional equity problem may be more serious when a deduction is denied for the contributions made by nonitemizers in the former group.

This study differs significantly from the existing empirical literature on charitable giving in the following respects. First, no studies have attempted to directly examine giving behavior of nonitemizers to assess the effect of tax incentives on the charitable contributions made by this group of taxpayers. Given the large proportion of nonitemizers among taxpayers, the failure to consider the idiosyncratic contribution behavior of nonitemizers may lead an erroneous inference regarding the contribution behavior of the population.[7] This study will use microeconomic tax return data for nonitemizers and itemizers to examine the incentive effect for the low- and middle-income taxpayers.

Second, Boskin and Feldstein [1978] and Dye [1978] tested the presence of an itemization effect independent of a price effect. However, neither study expressly defined the independent itemization effect. Without a clear definition of the itemization effect, the interpretation of empirical findings on the existence and magnitude of an itemization effect is subject to ambiguity. This study will employ an explicit definition of an itemization effect in order to identify and measure the independent itemization effect empirically. In this study the itemization effect is defined as the change in contributions by a utility maximizing taxpayer with multiple optima upon facing a standard deduction.

Third, while several empirical studies in this area (e.g., Reece [1979], Glenday et al. [1986], Brown [1987]) employed a simple Tobit model in order to correct biases often found in the Ordinary Least Squares (OLS) estimates, there is much to suggest that estimates generated by the simple Tobit technique are theoretically incorrect (see

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[7] Approximately 59.9 percent and 56.1 percent of taxpayers with incomes less than $50,000 and $75,000, respectively, are nonitemizers (Statistics of Income [1989]). This proportion of nonitemizers among taxpayers is expected to increase with the enactment of TRA '86.

Maddala [1988, p. 286]). Therefore, this study will develop a refined methodology to estimate the model of charitable contributions that allows a consistent estimate by applying the simultaneous equations Tobit technique.[8]

Finally, the methodology employed in this study will allow for the estimation model to account explicitly for the well-known endogeneity problem caused by the dependence of a taxpayer's marginal tax rate on the amount of contributions made. Previous efforts made to control this problem appear to have been unsuccessful in obtaining consistent estimates.[9]

The remainder of this study is organized as follows. The last part of this chapter addresses the central research questions for the dissertation. In Chapter 2, a brief presentation of the extant theory in this area of research is provided with a review of the empirical literature. Chapter 3 describes the functional relationship between demand for charitable contributions and its determinants in order to derive testable hypotheses. In particular, the itemization effect is defined within the context of the utility maximization behavior of a taxpayer. The simultaneous equations Tobit model used in this study is developed in Chapter 4, which also discusses alternative estimation methods to test the hypotheses and the measurement of variables that are used in the empirical models. Chapter 5 reports empirical results along with the interpretation of the results. A brief conclusion and suggestions for possible extension will close this study in Chapter 6.

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[8] The development of the model and the explanation of the estimation procedure will be presented in Chapter 4.

[9] See Reece and Zieschang [1985] for the detail.

1.3 Research Questions

A fundamental question in examining the incentive effect of a charitable contribution deduction arises regarding whether tax provisions affecting the price of giving have important effects on the size and distribution of giving.[10] Consider Figure 1 in order to examine the effect of a tax deduction for charitable contributions on giving. The path diagrams in Figure 1 illustrate possible effects of a tax deduction on giving and the direction of such effects.

Since a tax deduction reduces an individual taxpayer's net-of-tax "price" of making contributions, the deduction rules may have a significant effect on the amount of his charitable giving, depending on the sensitivity of the

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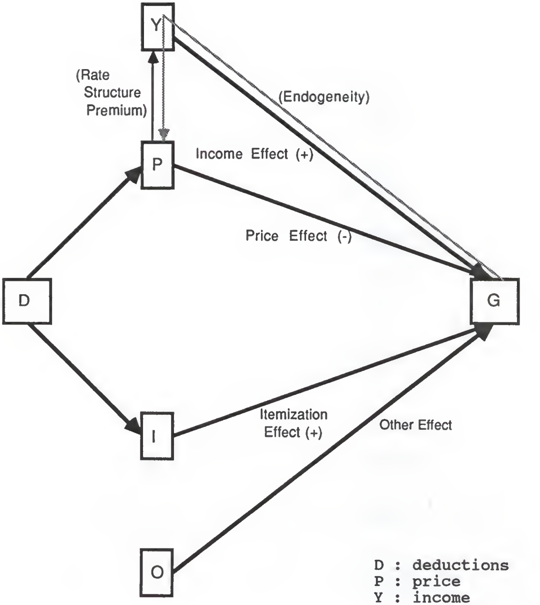
[10] Of course, the marginal tax rate is also an important policy variable affecting contributions by individuals. However, since tax policy regarding the tax rate schedule is not explicitly related to charitable giving, the effect of a tax law change regarding the marginal tax rates is not directly examined in this study.



D : deductions
P : price
Y : income
G : contributions
I : itemization
O : other factors

Figure 1. Summary of the Effect of a Tax Deduction on Charitable Contributions

taxpayer's giving to the change in the price of giving. The path from **D** through **P** to **G** represents this causal link between the tax deduction for charitable giving and the level of contributions through the price change (i.e., a price effect). Theoretically, the price of giving and the level of charitable contributions are negatively correlated assuming that a contribution is a normal good. On the other hand, an absolute difference in disposable income may also affect the level of contributions regardless of taxes. The path from **Y** to **G** represents this relationship between income and contributions (i.e. an income effect). In general, the correlation between income level and the amount of charitable contributions is expected to be positive.

For a given level of a taxpayer's income, however, contributions may endogenously affect his price of giving. With the progressivity of the federal income tax rates, increased contributions decrease taxable income, thereby reducing the marginal tax rate and, accordingly, increasing the taxpayer's price of giving. This dependence of price on the level of contributions is illustrated in the path from **G** through **Y** to **P** in Figure 1. In addition, the progressive tax rate schedule makes the budget set he faces nonlinear and thus increases his virtual income, as implied in the path from **D** through **P** to **Y**.[11]

Practical concerns of most empirical studies in this area of research have been twofold. First, an econometric problem: how to estimate the price effect considering the dependence of price on contributions. Second, a behavioral issue: whether the sensitivity of giving to tax incentives differs across the income distribution. In particular, a question of substantial importance for tax policymakers and one that has received increasing attention from researchers recently is whether there is a behavioral difference in responding to tax incentives between lower and upper income levels. The first research question of this study relates to this behavioral issue as follows:

> Are taxpayers in low- and middle-income classes responsive to the tax incentives provided by the tax laws in making their charitable contribution decisions?

The maintained assumption embodied in the above research concern is that, in essence, the price effect captures the effect of the availability of a tax deduction on the level of charitable contributions. An alternative view is that the giving behavior of a taxpayer is quite different depending on his itemization status. The path from **D** through **I** to **G** in Figure 1 implies this competing hypothesis. Therefore, of principal interest here is whether the difference in contribution levels arises simply out of a change in the marginal tax rates or whether there is any itemization effect which is independent of the price effect that can be used to explain variations in the amount of charitable contributions between taxpayer groups. Thus, the second research question can be phrased as follows:

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[11] Virtual income is an income amount corresponding to the assumption that a taxpayer is maximizing his utility as if his budget constraint were linear. See Lindsey [1986, pp. 6-7] for the definition of virtual income and the graphical presentation of the change in virtual income due to the nonlinear convex budget constraints. Also see Figure 3 in the next chapter.

> Does itemization have a significant independent effect on the decision to make a charitable contribution?

If the itemization status of a taxpayer explains the variation in the level of contributions, it may have a significant implication for tax policymakers. A deduction floor (e.g., the standard deduction), which is the general form of itemization that is present today, may be employed as a policy variable for a certain taxpayer group if their contributions are more responsive to the itemization effect than to the price change arising from a contribution deduction.

CHAPTER 2
LITERATURE REVIEW

2.1 The Theory of Demand for Contributions

In traditional microeconomic theory, it is customary to express the relationship between price and quantity demanded in the form of a demand function within the framework of utility maximization. By the same token, economists who regard charitable giving as a consumer good purchased by donors attempt to find determinants of the demand for contributions in the context of a behavioral relationship expressed in the demand function (e.g., see Schwartz [1970]). Analogous to the specification of demand functions in the theory of individual consumer choice, an individual's demand for contributions can be stated in general form as follows:

$$G = f(P, Y, Q),$$

where G measures the level of contributions, P is the price of giving, Y is disposable income available to the individual, and Q measures other variables.

Unlike prices for most other consumer goods, the price of giving is tax-defined. Price and income are thus correlated. That is, the net price of giving is determined by the charitable contribution deduction allowed by the tax laws. In order to see how the tax deduction affects the demand for contributions, consider the utility maximization problem facing an individual taxpayer as follows:

$$\max_{G,C} U(G,C)$$

$$\text{s.t. } P_c C = (1 - \tau)(Y - G), \tag{2.1}$$

where: C is the quantity demanded of other goods;

P_c is the price of other goods;

τ denotes the marginal tax rate; and

Y and G are as previously defined.

Substituting in the constraint and differentiating utility with respect to G, the resulting optimality condition is

$$\frac{U'(G)}{U'(C)} = \frac{1-\tau}{P_c}. \tag{2.2}$$

Equation (2.2) states that the ratio of marginal utilities of two goods, G and C, equals the ratio of the prices of two goods. Therefore, the price of making contributions (P) is equal to $1 - \tau$. Accordingly, examining the effect of a tax deduction for charitable giving is regarded as equivalent to examining the effect of a price change on the demand for contributions.

2.2 Previous Empirical Studies

2.2.1 Price effect

Due to the unavailability of data for nonitemizers, earlier econometric studies on this issue that used individual tax return data were confined to the analysis of taxpayers' giving behavior based on itemizers only. General findings were that contributions by taxpayers in low- and middle-income classes were insensitive to variations in tax rates while sensitive to variations in income (Taussig [1967] and Schwartz [1970]).[1] This empirical evidence was consistent with the view of earlier skeptics who suspected that these classes of taxpayers were generally small givers and hence the relatively low marginal tax rates applying to them and the small amounts they give do not produce enough tax savings to affect their charitable behavior.

In an effort to overcome problems (mainly methodological) in earlier studies, Feldstein [1975] redefined the price and income variables to remove the possible simultaneity bias. Presenting a much higher price elasticity (-1.24) and a lower income elasticity (0.82), he concluded that low- and middle-income taxpayers were as responsive to the tax incentive for contributions as those in higher-income brackets. As seen in Table 1, subsequent studies using individual tax return data or aggregate Statistics of Income (SOI) data generally confirm Feldstein's findings by presenting price elasticity greater than one and income elasticity significantly less than one for households in low- and middle-income classes as well as in high-income classes.[2] However, considerable ambiguity still remains in interpreting the estimates for low-income taxpayers (especially those with income below $20,000), since price elasticities generally vary over different time periods and the estimates lack precision for this income class.

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[1] Reporting implied price elasticities ranging from -0.04 to -0.10, Taussig [1967] reached the conclusion that the "incentive effect of the deduction for charitable contributions is, in aggregate, weak" (p. 16). In Schwartz's [1970] work, the incentive effect was relatively weak, with the estimated price elasticity less than one in absolute value (ranging from -0.41 to -0.76). However, by reporting that estimated price elasticities for low-and middle-income classes as high as these of the high-income classes, Schwartz presented the first evidence contradicting the general view that tax rates had little or no effect on contributions by the taxpayers in those income classes.

Not satisfied with the limitations of tax return data, Boskin and Feldstein [1978] used survey data for 1974 to estimate price elasticity for the low- and middle-income groups. Like survey data used by other economists in later years, their sample included nonitemizers as well as itemizers. Reporting a surprisingly high price elasticity

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[2] By reporting a fairly close range of estimates from -1.10 [Abrams and Schmitz, 1978] to -1.63 [Feenberg, 1987] for price elasticity and from 0.44 [Feenberg, 1982] to 0.82 [Feldstein, 1975] for income elasticity, the studies appear to form a "consensus" regarding the incentive effect of charitable deductions at low- and middle-income levels.

Table 1
Price elasticity estimates from selected empirical studies

	type of data All taxpayers	itemizers
Boskin and Feldstein [1978]	-2.59 (OLS)	
Dye [1978]	-2.25 (OLS)	
Reece [1979]	-1.19 (Tobit)	
Reece and Zieschang [1985]	- .85 (MLE)	
Schiff [1985]	-2.79 (Tobit)	
Brown [1987]	-3.27 (OLS) -3.62 (Tobit)	
Feldstein and Clotfelter [1976]	-1.15 (OLS)	-1.24 (OLS)
Feldstein and Taylor [1976]		-1.09 ~ -1.2 (OLS)
Abrams and Schmitz [1978]		-1.10 (OLS)
Clotfelter [1980]		-1.34 (OLS)
Clotfelter and Steuerle [1981]		-1.23 (OLS)
Feenberg [1988]		-1.63 (OLS)

(-2.54) and a relatively low income elasticity (0.69), they concluded that "contrary to intuition and common observation," (p. 354) low- and middle-income taxpayers would be responsive to the tax incentive to encourage giving. The studies using survey data provided insight into the examination of the incentive effect by expanding the focus to low- and middle-income taxpayers including nonitemizers. In general, however, the price elasticities estimated in typical survey studies were considerably higher for this group of taxpayers than those estimated in studies using tax return data (e.g., see Brown [1987]). The reason for this systematic difference in estimates has not yet been clarified.

Table 1 shows that there is a noticeable difference between the two sets of studies in addition to the data sources that were used. One obvious difference between the two sets of studies is that studies using tax return data (or SOI data) were compelled to use information about itemizers only while studies using survey data were able to include not only itemizers but nonitemizers in their samples. This implies that the significant difference in price elasticity estimates between the two sets of studies stems from using different sets of samples. While the majority of studies using contribution information about all taxpayers (i.e., including itemizers and nonitemizers) report the price elasticity estimates over two in absolute value those reported in studies using information about only itemizers' contributions range from -.95 to -1.28.

Another possible explanation for the difference was suggested in a recent work by Slemrod [1988]. Using 1982 returns audited under the Taxpayer Compliance Model Program, Slemrod separately estimated the responsiveness of actual contributions and that of overstated contributions. Reporting the estimated price elasticity of -2.34 for contributions adjusted by an IRS auditor after an audit and -2.04 for contributions reported and presumably overstated in tax returns, respectively, he concluded that "overstatement is apparently less price responsive than actual giving, implying that the responsiveness of actual giving is higher than is suggested by studying reported contributions." This finding seems to suggest that contributions in survey data are closer to the audit-adjusted contributions than contributions reported in tax returns. In the absence of a theoretical explanation of the observed systematic difference, however, questions still remain about using either estimate in predicting the impact of tax changes on contributions.

Several recent simulation studies have used a price elasticity of greater than one in absolute value to predict the level of charitable contributions under the different tax regimes suggested by various tax reform proposals (e.g., Clotfelter and Salamon [1982], Feldstein and Lindsey [1983], Clotfelter [1985b], Lindsey [1986]). However, even with the data based on random samples from surveys, the estimates for low- and middle-income classes are rather unstable across studies, depending not only on income scales but also on the estimation techniques used. Accordingly, Rudney's [1985] assertion that the charitable deduction is "inefficient at middle and lower income" (p. 368) may deserve more attention before unconditional acceptance of the consensus view.[3]

2.2.2 Itemization Effect

One important question posed by Boskin and Feldstein's [1978] study is whether there was any itemization effect independent of the price effect; that is, whether any observed price effect was in fact a garbled effect arising from a change in itemization status. By using a modified equation in which the intercept terms were allowed to vary between itemizers and nonitemizers, they obtained estimates for intercepts not significantly different from each other. This result supported their hypothesis that there was no independent itemization effect.

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[3] Rudney's argument was based on the study results of Auten and Rudney [1984]. Using data from the 1971-1975 Capital Gain Panel survey, Auten and Rudney replicated the previous studies done by Feldstein and various collaborators. Using the weighted least squares estimation technique, they found the price elasticity of -0.69 for the lower-income group with income below $100,000 and -1.35 for the upper-income group.

Dye [1978] also used survey data to estimate the price and income elasticities. Although the elasticities were quite high (-2.25 for price and 0.53 for income) in the basic equation estimated using data for both itemizers and nonitemizers, Dye's dummy variable for itemization status in a separate equation performed as well in explanatory power as the price term in the basic equation. On the other hand, the estimated price elasticity for the itemizers group was not significantly different from zero. Therefore, contrary to Boskin and Feldstein [1978], Dye reached the conclusion that the "price effect is really an itemization effect misspecified as a constant elasticity" (1978, p. 313).

To date, only the two studies discussed above empirically examined the effect of itemization on contributions despite its important policy implication. Furthermore, it is surprising that these studies do not include any theoretical definition of the itemization effect. This lack of a definition may be the reason for the ambiguity that exists regarding the interpretation of these findings. A clear definition of the itemization effect is necessary to prove the existence or nonexistence of that effect.

Another ambiguity associated with the definition of the itemization effect arises from the lack of clear distinction between the itemization effect and the structural difference in the contribution behavior between itemizers and nonitemizers. In general term, the former is used to describe the change in the level of contributions when an individual taxpayer shifts his itemization status while the latter refers to the inherent behavioral difference between the two groups of taxpayers. Therefore, estimating separate equations for itemizers and all-taxpayers (or nonitemizers) and comparing constant terms (Boskin and Feldstein [1978]) or price elasticities (Dye [1978]) may not be appropriate for the test of the presence of an independent itemization effect because the shift of itemization status which creates the itemization effect has no bearing on the change in the level of contributions by existing itemizers. It is contributions by itemizers who switch itemization status that would be affected by the switch. It appears that both Boskin and Feldstein [1978] and Dye [1978] merely tested the presence of structural difference in giving behavior between the two groups.

2.2.3 Data Problem

Perhaps the most serious problem with many of the previous studies is their reliance on household information which may not depict the overall picture of the taxpayer population. Since the returns of taxpayers do not contain data for nonitemizers, virtually all econometric studies using tax return data are necessarily based on itemizers only. Two types of problems arise here.

First, if the giving behavior of itemizers is different from that of nonitemizers, the resulting estimates may not be representative of the population. This problem with representativeness is apparent in Figure 2 where the proportion of nongivers is 55.1% among nonitemizers in 1986, but only 9.8% among itemizers. In particular, the restriction of any study to only taxpayers with itemized deductions on their returns can eliminate substantial information on the behavior of taxpayers with lower income because many of them are also nonitemizers. As summarized in Figure 2, the possibility of the loss of valuable information on nonitemizers is made evident by the number of returns filed by nonitemizers in 1986.[4] Accordingly, inferences from information relating only to itemizers may not be applicable to the contribution behavior among low-and middle-income taxpayers who are largely nonitemizers.

The second disadvantage of contribution data based on tax returns is that the equations based on samples of only itemizers may be subject to sample selection bias if the decision to itemize is itself, in part, a function of the

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[4] Under the pre-ERTA tax regime, only the itemizers should be used in the estimation of the equation since there is no way of distinguishing a large number and high proportion of givers among nonitemizers [cell (3)] from those who did not give but filed tax returns [cell (4)]. Given the large number of nonitemizers [cells (3) plus (4)] and the proportion of givers to nonitemizers being different from that of itemizers [cells (1) and (2)], resulting price elasticity estimates may be significantly biased.

	Itemizer	Nonitemizer	
Giver	36.7 million (90.2%) ($53.8 bil) (1)	28.0 million (44.9%) ($13.3 bil) (3)	64.7 million (62.8%) ($67.1 bil)
Nongiver	(2) 4.0 million (9.8%) ($0)	(4) 34.4 million (55.1%) ($0)	38.4 million (37.2%)
	40.7 million (39.5%)	62.4 million (60.5%)	103.1 million (100%)

Source: U.S., Internal Revenue Service, "Individual Income Tax Returns 1986," Statistics of Income (1989).

Figure 2. Number of Return Filers (1986)

level of contributions.[5] Therefore, the reliance on tax data alone is a source of uncertainty about all previous estimates.

The second source of data on individual contributions is information from household surveys. By using household survey data, researchers have attempted to avoid the restrictions imposed by tax return data. The most important advantage of survey data over tax return data is that the former provides information on nonitemizers as well as itemizers. However, the accuracy of survey responses may be less than the accuracy of information given on tax returns due to the typical moral hazard problems on the part of respondents. Without tax incentives to keep track of their gifts, nonitemizers may tend to underreport their giving in surveys. Furthermore, the reluctance of some taxpayers to reveal sensitive tax information may result in nonresponse bias even among itemizers that leads to a skewed distribution. Accordingly, problems with sets of data used in the econometric studies in this area create another uncertainty regarding the effect of taxes on contributions. As Clotfelter [1985c] pointed out, a dilemma of choosing between "the precise data of a self-selected group (in studies using tax data for itemizers) or the imprecise data of a randomly-selected group (in surveys)" (p. 1276) applies here. The natural inference is that a more precise estimate for price and income elasticities can be derived by using a set of data which has less self-selection bias and imprecision.

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[5] See Heckman [1979] for a discussion of the sample selection bias issue. Clotfelter [1980] specifically addressed the problem of the selection bias associated with the inclusion of borderline itemizers in a sample.

Fortunately, ERTA '81 made it possible to obtain a less biased and more precise data by providing nonitemizers with an incentive to claim charitable deductions in their tax returns. As shown in Figure 2, the data base on the individual tax returns is expanded to include information on the bulk of nonitemizers who would not have been included without the DCD provisions.

2.2.4 The Dependence of Price on Contributions

One ambiguity frequently observed in previous studies involves the definition of the price of giving when price is dependent on the amount that is contributed. This endogeneity problem arises due to the nonlinear budget constraints facing a typical taxpayer under the progressive income tax system as illustrated in Figure 3. For a given income level of an individual, contributions may cause a decrease in his taxable income and, accordingly, his marginal tax rate.[6] Due to the complementary relation of

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[6] For simplicity, it is assumed here that the taxpayer faces up to two marginal tax rates represented by segments **BN** and **MN** depending on his taxable income. Since a taxpayer's charitable giving is subject to an overall ceiling limitation as a percentage of AGI, the slope becomes -1 after point **M**. Very few individuals reach this ceiling.

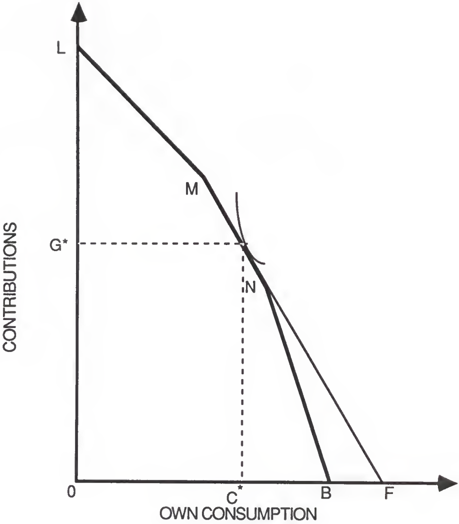

Figure 3. The Effect of a Tax Deduction For Charitable Contributions: The Convex Budget Constraint

the tax rate to the price of giving (i.e., $P = 1 - \tau$), the reduction in the marginal tax rate will lead to the increase in the price of giving. Therefore, the slope of the budget line decreases piecewise as a taxpayer contributes increasing amounts to charity.[7] Largely because of the dependence of price on contribution, employing values of price and income based on an individual's actual marginal tax rate(s) and income in estimating the incentive effect of a tax deduction on contributions would lead to the well-known simultaneity bias, resulting in inconsistent estimates.[8]

In order to circumvent the simultaneity problem, Feldstein [1975] and subsequent studies (e.g., Boskin and Feldstein [1978], Clotfelter [1980], Brown [1987]) used the first dollar price as a surrogate for the price of giving. The first-dollar price is defined as the price applying to an individual's first dollar of giving; that is, the price if there were no contributions made at all. Although this first-dollar price is independent of the contribution decision, it may result in biased estimates, especially for those contributors with a level of contributions sufficient to cause a change in the marginal tax rate.[9]

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[7] The increased portion (i.e. segment **BF**) of virtual income (OF) on the C-axis is called the rate structure premium and the taxpayer is assumed to regard that as an additional income in maximizing his utility. The effect of the increase in virtual income on the level of contributions is not separately estimated in this study. See Reece and Zieschang [1985] and Lindsey [1986] for further explanation of this premium.

[8] See Clotfelter [1985a] and Reece and Zieschang [1985] for discussions of this simultaneity bias in the context of charitable giving.

In an attempt to obtain consistent estimators, Reece and Zieschang [1985] proposed a nonlinear estimation method in which the dependence of the tax rates on the amount of contributions that were made was explicitly incorporated in the model. However, this method also has problems. The computation is quite complicated and the comparison of elasticities between income classes is difficult, if not impossible. Therefore, an estimation procedure that more appropriately accounts for the endogeneity problem is necessary in order to obtain consistent estimates for parameters of interest.

2.2.5 OLS and Simple Tobit model

An important but frequently ignored problem with earlier studies using either survey data or tax return data is a nonnegativity constraint on giving, which arises from data with many zero observations. Because of the enactment of the above-the-line deduction, the tax return data for 1985 contain information on charitable contributions made by nonitemizers. However, the same nonnegativity constraint problem is likely to occur because the dependent variable (giving) has a number of its values clustered at a limiting value, zero.[10] In such a case, OLS procedure would yield a downwardly biased estimate of the coefficients. As shown in Figure 2, on the other hand, the proportion of nongivers is much larger among nonitemizers than among itemizers. Since the price of giving for a nongiving nonitemizer is unity, the presence of a disproportionately large number of observations of 1 in the equation will boost the absolute value for the price elasticity.[11]

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[9] Clotfelter [1985a] ruled out the significance of the endogeneity problem arising from the use of the first-dollar price, arguing that there was no significant difference between the average first-dollar price and the average marginal price. However, Reece and Zieschang [1985] viewed this as a serious problem that potentially biased the estimate because, in their sample, the tax brackets of 15.4% of the givers were affected by their giving. The seriousness of this problem may be considerably alleviated under TRA '86 since the number of tax brackets was reduced to only four from fourteen.

This nonnegativity constraint of giving created by the censored observations at the value of zero calls for an alternative technique using all observations to estimate a regression line. Due to this feature of the data, Tobin's [1958] maximum likelihood estimation (Tobit) procedure for limited dependent variables has often been used for the estimation in order to allow the coefficient on the price variable to be adjusted by the probability that the taxpayer that has a zero value for his contributions is observed making a nonzero contribution (e.g., see Reece [1979], Glenday et al. [1986] and Brown [1987]).[12]

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[10] Furthermore, the data for the years 1982 through 1984 contain censored observations at the upper limit because of a ceiling on the deduction amount. See footnote 3 of Chapter 1.

[11] See Glenday et al. [1986] among others for the potential bias due to similar data problems. For further explanation of the bias arising from using OLS, see Heckman [1976, 1979], Amemiya [1984], and Maddala [1983, p.2].

However, the simple Tobit model also has some problems. First, giving is nonnegative so that observations of charitable contributions can not, in principle, take on negative values. Unlike the case for which a typical simple Tobit model is used, zero values of charitable contributions are observed because individual taxpayers decide not to give. For this reason, a simple Tobit model may not be appropriate for the estimation of a contribution demand function. Maddala [1983, 1988] suggested modeling the decisions that produce the zero observations separately rather than using the Tobit model mechanically. Second, a simple Tobit model by itself cannot give any remedies to the endogeneity problem. Given that the exogenous measures are also not flawless (see Section 4.2), the simple Tobit model would produce inconsistent estimators unless the estimation model is designed to incorporate the dependence of the price variable on the amount of contributions that are made. An alternative estimation procedure is called for to avoid these two problems and to obtain consistent estimators. The simultaneous equations Tobit model, developed primarily in the field of labor-supply research, will be modified into a model of contribution demand function to solve these problems. This model is discussed in detail in Chapter 4.

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[12] See McDonald and Moffitt [1980] for a description of how the Tobit model is useful for this purpose. For a more detailed technical description and classification of various types of Tobit models, see Maddala [1983, Chapter 6.3], and Amemiya [1984].

CHAPTER 3
DEVELOPMENT OF HYPOTHESES

3.1 Functional Relationship

A constant elasticity consumer demand function is convenient to use because it has a multiplicative form so that the elasticities are parameters. Hence, for a contributor,

$$G = aP^{b_1}Y^{b_2}e^{Q \cdot b_3}, \qquad (3.1)$$

where: G = the level of contributions;

P = the price of giving;

Y = income;

Q = other variables representing personal characteristics;

e = the base of the natural logarithm system,

a = a constant;

b_1 = the price elasticity of giving;

b_2 = the income elasticity of giving; and

b_3 = a vector of other constants.

The basic specification uses a log-linear equation to estimate constant elasticities with respect to P and Y.

$$\ln G = \ln a + b_1 \ln P + b_2 \ln Y + Q \cdot b_3 + \varepsilon . \qquad (3.2)$$

In the logarithmic function, equal arithmetic steps of logarithms represent equal proportionate steps of variables. This property of a logarithmic function allows the functional model to be consistent with the definition of price and income elasticities of demand for contributions. The most critical assumption implicit in this log-linear model is that the income and price elasticities are constant, that is,

$$\frac{\partial \ln G}{\partial \ln P} = b_1 \text{ and}$$

$$\frac{\partial \ln G}{\partial \ln Y} = b_2 .$$

Since a high price elasticity is a sufficient condition for the effectiveness of a tax incentive, most empirical studies examining the contribution behavior of individual taxpayers focus on whether contributions are elastic to the price change caused by a charitable contribution deduction. The price elasticity will be minus one when the changes in contributions are equal in magnitude and opposite in direction to the changes in the price of giving or tax

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revenues due to a tax subsidy for contributions.[1] Other things being equal, a tax policy for charitable giving would be neutral with respect to the incentive effect when the price elasticity is -1. Assume a new deduction policy is enacted, which is designed to decrease the price of giving by 10 percent, leads to a 20 percent increase in giving. The new policy would be referred to as having a high incentive effect since the price elasticity is greater than unity in an absolute value (i.e., -2 or (20%)/(-10%)). Virtually all econometric studies of charitable contributions use the critical value of minus one as a threshold in assessing whether contributions are elastic to a tax incentive or an income variation. Following previous studies, this study will use an absolute value of one for the elasticity test.

3.2 Development of Hypotheses

The basic specification of equation (3.2) is modified to estimate the following cross-sectional regression to test whether contributions by a group of taxpayers are responsive to the variation in price:

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[1] See Clotfelter [1985a, p. 60] for the mathematical explanation of the link between the incentive effect and price elasticity as well as the policy implication of estimates of the price elasticity.

$$\ln(G + 10) = b_0 + b_1\ln P + b_2\ln Y + b_3MAR + b_4AGE + b_5DEP + \varepsilon \qquad (3.3)$$

where:

G = contributions;

P = price of giving;

Y = income;

MAR = dummy variable equal to one if married;

AGE = age dummy equal to one if 65 or over;

DEP = number of dependent children in a taxpayer's household; and

ε = error or disturbance term.

To avoid the log of zero, $10 is added to all reported values of giving.

3.2.1 Price effect

As seen previously in Figure 1, the price effect is normally confounded with the income effect. Thus, the main focus of examining the effect of a tax deduction for charitable contributions is on the separation of the price effect from other effects by estimating the price elasticity of giving. The confounded effect is apparent in Table 2 which presents average contributions over income distributions and by itemization status. An observation of the monotonic increase of average contributions with income may lead to a conclusion of a high correlation between contributions and income; that is, a high income elasticity

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Table 2
Average Giving of Givers by Income and Itemization Status

Number of returns (1,000) filed by givers in parentheses

AGI (000's omitted)	1984		1985		1986	
	I[a]	NI[b]	I	NI	I	NI
$1 - $5	$403	$168[c]	$440	$194[d]	$429	$172
	(304)	(2,380)	(330)	(2,368)	(389)	(2,599)
$5 - 10	672	192	617	327	576	337
	(1,283)	(5,377)	(1,217)	(5,828)	(1,242)	(5,981)
$10 - 15	738	208	779	355	659	417
	(2,301)	(5,111)	(2,194)	(5,482)	(1,944)	(6,142)
$15 - 20	761	208	814	394	722	518
	(3,199)	(3,930)	(3,104)	(4,445)	(2,803)	(4,829)
$20 - 30	786	220	805	433	795	569
	(8,037)	(4,150)	(7,699)	(4,703)	(7,526)	(5,381)
$30 - 50	967	228	979	507	970	766
	(13,261)	(1,784)	(14,111)	(2,183)	(14,093)	(2,761)
$50 - 75	1,568	260	1,582	684	1,512	1,402
	(4,272)	(157)	(5,165)	(209)	(5,143)	(291)
$75 - 100	2,419	268	2,517	736	2,535	2,559
	(984)	(24)	(1,184)	(25)	(1,456)	(43)
$100 - 200	4,304	264	4,213	857	4,304	1,848
	(732)	(7)	(870)	(13)	(1,061)	(15)
$200 - 500	14,013	268	15,500	1,122	16,593	10,616
	(193)	(1)	(230)	(2)	(277)	(2)
$500 - 1,000	31,405	268	48,112	1,356	33,220	12,416
	(28)	(0.1)	(40)	(0.1)	(50)	(0.4)
$1,000+	141,124	224	146,411	57,314	211,310	40,527
	(15)	(0.0)	(17)	(0.0)	(31)	(0.0)
Overall Average	1,217	204	1,326	372	1,466	474
All Returns[e]	(34,608)	(22,921)	(36,162)	(25,359)	(36,714)	(28,041)

Note:

[a] : itemizer

[b] : nonitemizer

[c] : Amount of deduction claimed x 4, (ceiling limitation: $300)

[d] : Amount of deduction claimed x 2, (no ceiling limitation)

[e] : including nontaxable returns

Source: U.S., Internal Revenue Service, "Individual Income Tax Returns 1984," Statistics of Income (1986).

———, "Individual Income Tax Returns 1985," Statistics of Income (1988).

———, "Individual Income Tax Returns 1986," Statistics of Income (1989).

of contributions. However, since taxes also affect individual giving through the changes in the price of giving, the observed variations of contributions over the income distribution may not be fully attributable to the income variations. The price of giving which is a function of marginal tax rates (i.e., $p = 1 - \tau$) may play an important role in determining the contribution demand independent of the income level.

The hypothesis to be tested has the following test form:

$H1_0$: $b_1^{L+M} = -1$

The demand for charitable contributions by taxpayers in low- and middle-income classes is not price-elastic.

$H1_A$: $b_1^{L+M} < -1$

The demand for charitable contributions by taxpayers in low- and middle-income classes is price-elastic.

The question that follows is whether the tax sensitivity of giving is different across the income scale. Any significant difference in the price sensitivity is interpreted as evidence of a behavioral difference in contribution decisions. This suggests the following hypothesis:

$H2_0$: $b_1^{L+M} = b_1^H$

The demand for charitable contributions by taxpayers in the low- and middle-income classes is as elastic as the demand for charitable contributions by taxpayers in the high-income class to the price of giving.

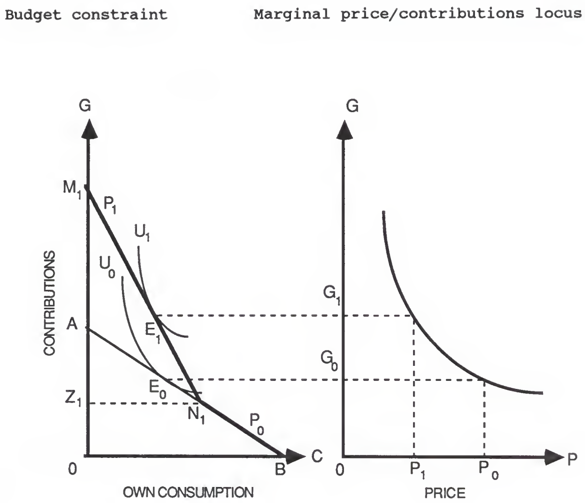
$H2_A$: $b_1^{L+M} \neq b_1^{H}$

The demand for charitable contributions by taxpayers in the low- and middle-income classes is not as elastic as the demand for charitable contributions by taxpayers in the high-income class to the price of giving.

3.2.2 Itemization effect

Of particular research interest in this study is whether itemization per se affects giving independently of price and income. In previous studies, it has also been asked whether there is an itemization effect independent of the price effect (e.g., Boskin and Feldstein (1978)). As noted in Chapter 2, however, a theoretical definition of the itemization effect must precede the test for the presence of that effect.

In order to define and identify the effect of itemization on contributions, it is useful to consider budget constraints facing a taxpayer in a two-commodity space comprising two goods: charitable contributions (G) and own consumption (C). Figure 4a illustrates the utility-maximizing individual's consumption choice between charitable giving and other goods both in the presence and absence of a deduction for such gift. The vertical axis represents charitable contributions made by an individual



Budget constraint

Marginal price/contributions locus

Figure 4a. Itemization Effect

while the horizontal axis reflects the individual's own consumption of other goods which are equivalent to the disposable income after such gifts. The line **AB** is the budget set which an individual taxpayer faces when there is no deduction for contributions and $\mathbf{E}_0$ is an optimum where the taxpayer maximizes his or her utility by choosing the optimal combination of consumptions. The price of giving is given by the reciprocal of the slope of the budget line. Thus, $\mathbf{p}_0$ represents the price of giving in the absence of a deduction for contributions.

For simplicity, the charitable contribution is assumed to be the taxpayer's only deductible expenditure. If a standard deduction is introduced in the tax system and a deduction is allowed for contributions made over the amount of a standard deduction ($\mathbf{Z}_1$), the price of contributions made over the floor will be reduced. p_1, the reciprocal of the slope of the new budget segment $\mathbf{M}_1\mathbf{N}_1$, represents this reduced price of giving. By turning budget line **AB** clockwise around point $\mathbf{N}_1$, the introduction of a standard deduction alters the budget constraints for an individual, generating the non-convex, piecewise linear, budget set $\mathbf{M}_1\mathbf{N}_1\mathbf{B}$. The taxpayer may simply choose a new optimum at $\mathbf{E}_1$ along the first segment to the left of $\mathbf{N}_1$. From the relationship between price and contribution depicted in the left-hand side panel of Figure 4a, the individual taxpayer's marginal price/contributions locus (MPCL) can be derived as seen in the right-hand side panel.[2] If giving is a normal good, this utility-maximizing behavior will result in the increase of the taxpayer's contributions by the amount corresponding to G_1-G_0 along the vertical axis.

Note that the MPCL in Figure 4a is continuous. When a demand function is everywhere continuous and differentiable, the elasticity of demand for contribution can be determined immediately from the slope of the MPCL curve. The MPCL will be continuous as long as the standard deduction (Z) does not exceed the original amount of contribution at E_0. At certain prices, however, these assumptions of continuity and differentiability may not be justifiable, as seen Figure 4b and Figure 4c.

Note also that, in Figure 4b, the standard deduction increases to Z_2 from Z_1 so that the budget segment kinks at N_2 where $Z_2 > G_0$. In this case, multiple optima may occur which mean that the taxpayer will be in an optimum at more

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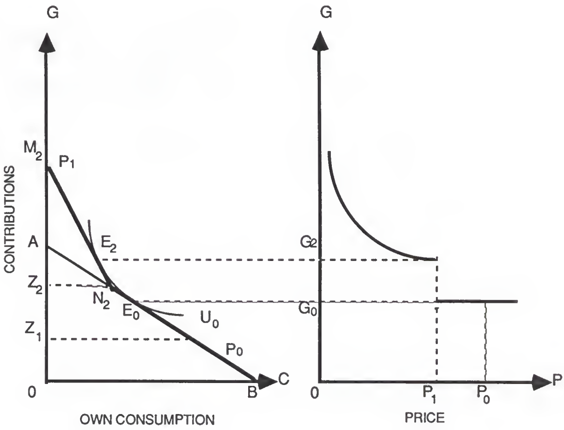
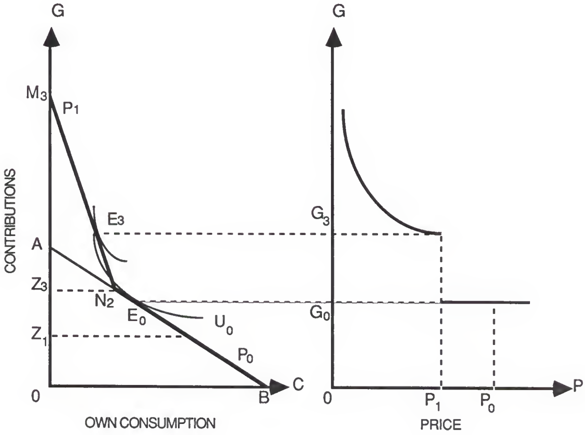
[2] The contribution demand represents the locus of optima which consists of successive contribution plans of the contributor that occur when the price of a contribution is altered while all other factors remain constant. In Figure 4, however, as one moves along the curve (MPCL), the marginal price does indeed change but everything else is not held constant. Because pricing is nonlinear, virtual income is not held constant. Nor is nominal after-tax income. In a strict sense, this curve is a pseudo-demand curve rather than ordinary demand curve. Thus, I use a different label for this curve. For this part of discussion, I am indebted to Professor Richard Steinberg.



Budget constraint

Marginal price/contributions locus

Figure 4b. Itemization Effect



Budget constraint

Marginal price/contributions locus

Figure 4c. Itemization Effect

than one quantity (i.e., E_0 and E_2).[3] In other words, the utility-maximizing choice of an optimum at E_2 yields utility that is at least as great as the utility that can be obtained by choosing an optimum at point E_0. However, the relationship between contributions demanded and the marginal price of a contribution is single-valued. Therefore, the utility maximizing taxpayer may opt to choose point E_2 instead of E_0 by increasing his contributions.

The precipitous change in contributions due to this duality of optimum can be called the pure itemization effect. At point N_2, the price elasticity which measures the price effect is not well-defined since the phenomenon of multiple optima makes the contribution demand function discontinuous as the MPCL in Figure 4b illustrates. The demand function is not differentiable at that point. Given the analysis described above, the itemization effect is defined as the change in contribution demand as a result of dual optima which arise when a nonitemizer switches to an itemizer. This definition of the itemization effect clearly precludes a possible contamination by the price effect because the price effect is well-defined only when the demand function is continuous and differentiable. As shown in Figure 4c, dual optima will continue to exist as long as

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[3] An example of multiple optima and its application for the price elasticity of demand are provided in Acton et al. [1980].

the new budget segment M_1N_1 crosses a taxpayer's pre-standard-deduction indifference curve U_0. The derived MPCL curve resembles an ordinary demand curve except for gaps in the neighborhood of Z_1 contributions at which itemization starts.

The graphical analysis has shown that an itemization effect is experienced only by those individual taxpayers who face dual optima and thus are not able to get a unique solution to a utility maximization problem upon confronting a standard deduction. Typically, it is borderline itemizers that experience such multiple optima. A borderline itemizer is an individual taxpayer who would not have been an itemizer in the absence of charitable giving. Therefore, an effort to identify the itemization effect on giving must focus on how significantly the level of charitable contributions by a borderline-itemizer is affected by the switch of his/her itemization status to an itemizer. To what extent itemization affects charitable giving is open to empirical inquiry.

To examine the itemization effect, equation (3.3) is modified as follows:

$$\ln(G+10) = (b^{BI}_0 - b^I_0)D + b^I_0 + b_1 \ln P + b_2 \ln Y + b_3 MAR + b_4 AGE + b_5 DEP + \varepsilon, \qquad (3.4)$$

$$\text{where} \quad D = \begin{cases} 1 \text{ if borderline-itemizer (BI)} \\ 0 \text{ if itemizer (I)} \end{cases}$$

Assuming that there is no difference in giving behavior except the itemization effect, if any, between itemizers and borderline-itemizers, any itemization effect would be captured in the difference between constant terms for each group. The testable hypothesis will be in null form:

$H3_0$: $b^{BI}_0 = b^{I}_0$.

There is no significant itemization effect independent of other effects.

$H3_A$: $b^{BI}_0 \neq b^{I}_0$.

There is a significant itemization effect independent of other effects.

It is expected that the null hypothesis will be rejected. However, taking into consideration the relatively small proportion of those borderline-itemizers in population, the itemization effect that occurs at an aggregate level is expected to be small.[4]

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[4] Of the 108,840 returns from the 1985 data used in this study only 1,518 returns (1.4%) are borderline itemizers who would not find it advantageous to itemize if they had not made contributions. With the direct charitable deduction allowed for the nonitemizers under the ERTA '81, the budget segment N_1B would become steeper than the case without the nonitemizer's deduction. Thus, the number of borderline itemizers are expected to be much fewer relative to those during the pre-ERTA era.

As mentioned in Chapter 2, one important research concern in the area of charitable contributions is whether there is any significant difference in giving behavior between itemizers and nonitemizers. Large absolute differences in average contributions are generally observed not only across the income scale, but also between itemizers and nonitemizers at virtually all income levels. Table 2 shows that itemizers' average contributions are as much as two or more times those of nonitemizers. Due to the deductibility of contributions, an itemizer's price of giving is generally lower than that of a nonitemizer. This difference in contribution behavior may stem from the structural difference between two different populations. In previous studies, the structural difference in giving behavior between the two groups of taxpayers was understood as evidence for the presence of the effect on contributions of a shift into or out of itemization status. Based on the definition described above, however, the itemization effect is defined as arisings solely out of change in the itemization status. This distinction of the definition leads to this study's investigation of the presence of a structural difference.

In Boskin and Feldstein (1978), the implicit assumption was that there was no difference in giving behavior except the itemization effect between itemizers and nonitemizers and that any itemization effect would be captured in the difference between constant terms for each group. This assumption allowed them only constant term to float in their estimation equation. However, not allowing for differences in other coefficients appears too restrictive, and at least unreasonable for the 1985 data in particular.[5]

To examine the presence of the structural difference in giving behavior between two populations appropriately, equation (3.4) should be modified allowing slope coefficients to float as follows:

$$\begin{aligned} \ln(G+10) = {} & (b_0^I - b_0^{NI})D + b_0^{NI} \\ & + (b_1^I - b_1^{NI})D*\ln P + b_1^{NI}\ln P \\ & + (b_2^I - b_2^{NI})D*\ln Y + b_2^{NI}\ln Y \\ & + b_3 MS + b_4 AGE + b_5 DEP + \varepsilon, \end{aligned} \tag{3.5}$$

$$\text{where} \quad D = \begin{cases} 1 \text{ if itemizer (I)} \\ 0 \text{ if nonitemizer (NI)} \end{cases}$$

The hypothesis corresponding to the question will be in null form:

$H4_0$: $b_0^I = b_0^{NI}$, $b_1^I = b_1^{NI}$, and $b_2^I = b_2^{NI}$

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[5] Boskin and Feldstein (1978) validly assumed that the income elasticity of nonitemizers was not contaminated by the price term because the price of giving was unity for all nonitemizers. Owing to the DCD provisions, however, the price of giving was no longer uniformly -1 for all nonitemizers.

There is no difference in giving behavior between itemizers and nonitemizers.

H4$_A$: $b_0^I \neq b_0^{NI}$, $b_1^I \neq b_1^{NI}$, or $b_2^I \neq b_2^{NI}$

There is a difference in giving behavior between itemizers and nonitemizers.

Any significant nonzero coefficient estimate for a dummy variable may imply that there is a structural difference between the two groups of taxpayers in making charitable contribution decisions. Using slope dummies in a simultaneous equation system makes equations underidentified, however, parameters of interest are estimated for each group of taxpayers using simultaneous equations.[6]

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[6] It is assumed that error terms are not correlated between two groups, i.e., $\mathrm{Cov}(\varepsilon_I \varepsilon_{NI}) = 0$.

CHAPTER 4
MODELS AND ESTIMATION METHODS

Because of the policy importance of empirical estimates of models of charitable contributions, substantial effort has been put forth to obtain consistent parameter estimates using more sophisticated econometric techniques. As discussed in Chapter 2, considerable attention has been devoted to each of following econometric issues in previous empirical studies: (1) the selectivity bias arising from using information from tax return data only for itemizers, (2) the selectivity bias arising from estimating a censored or truncated regression model without considering the characteristics of contributions data (i.e. limited dependent variables), and (3) the simultaneity bias due to the dependence of the price of giving on the level of contributions.

For the first type of bias, researchers have circumvented the data problem by simply choosing survey data that contain information on nonitemizers' contributions over tax return data. Several studies (see Reece [1979], Glenday et al. [1986] and Brown [1987]) used a Tobit model to control the selectivity bias arising from handling samples that were drawn from a truncated distribution. However, no econometric studies on charitable contributions have dealt with the correction of the selectivity bias due to the truncation of sample and the simultaneity bias at the same time. Further, the contribution decision process that produces zero observations has not been incorporated in modeling contribution demand in most studies. Building on prior theoretical and empirical literature in labor-supply research, this chapter develops the contribution decision models and the estimation models, with particular emphasis on the simultaneous equations Tobit model.

4.1 Contribution Decision

To start with, consider the same utility maximization problem that was described in equation (1.1). Given a price of giving which is determined by the applicable tax rate, an individual taxpayer maximizes his utility function U(G,C) subject to Y - T(Y,G) = G + C, where C represents his own consumption of all other goods and Y is income. Taxes are a function of income and contributions (T(Y,G)). The first-order conditions for a maximum will generate the following equation:

$$\frac{\partial U/\partial G}{\partial U/\partial C} = 1 - \tau, \tag{4.1}$$

where τ represents marginal tax rate of the individual. The left-hand side of (4.1), the marginal rate of substitution (MRS) of contributions with other goods, can be called the reservation price of giving. The reservation price, which is denoted P^R, is defined as the price that a contributor keeps in mind to compare with the actual price when he decides to purchase contributions. The right-hand side of (4.1) is the applicable price of giving, denoted P^A. Thus, equation (4.1) implies that a utility maximizing taxpayer's desired level of contributions is determined at a point where his reservation price of giving equals his applicable price. The taxpayer does not make a charitable contribution if

$$\left.\frac{\partial U/\partial G}{\partial U/\partial C}\right|_{G=0} < 1 - \tau, \tag{4.2}$$

and makes a contribution if the inequality in (4.2) is reversed.[1] The explanation of (4.2) is straightforward. The marginal utility per dollar spent on giving remains lower than that of own consumption even when zero units of contributions are purchased. Then we would have a corner optimum where own consumption C is still being purchased in positive amounts. Naturally, if he gives, the actual price of giving must be such that

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[1] Gronau [1973] initially developed a model for the reservation wage, which is modified for the reservation price in this study. See Gronau [1973; 1974] for more detail.

$$P = P^A = P^R. \tag{4.3}$$

Since $P = 1 - \tau$, MRS of G for C equals the price of giving.

Now, a taxpayer's decision with regard to contributions can be modeled as follows:

$$\begin{cases} G^* > 0 & \text{if } P^R|_{G=0} > P^A|_{G=0} \\ G^* \leq 0 & \text{if } P^R|_{G=0} \leq P^A|_{G=0}, \end{cases} \tag{4.4}$$

where G* denotes the desired (planned) level of contributions of an individual. Following the decision rule, the individual may choose the level of his actual giving. Hence his contributions will be

$$G = \begin{cases} G* & \text{if } G^* > 0 \\ 0 & \text{if } G^* \leq 0, \end{cases} \tag{4.5}$$

where G is the observed amount of contributions. Equations (4.4) and (4.5) assume that a person donates something and, thus, a positive value for contributions is observed only when the applicable price of giving is lower than his reservation price.

4.2 Development of Simultaneous Equations Tobit Model

In order to obtain an estimation model for the contribution demand, the log-linear equation (3.2) may be rewritten in a more general form,

$$G^* = P^A\alpha + X_1\beta_1 + \varepsilon_1, \qquad [\varepsilon_1 \sim \text{i.i.d., } N(0,\sigma_1^2)] \qquad (4.6)$$

where X_1 is a vector of variables that determine the demand for contributions other than the applicable price of giving (P^A), which can be observed from tax return data and β_1 is a vector of coefficients of those variables.

As described above, an individual will choose to donate nothing when the price of giving is higher than his reservation price. However, the reservation price is unobservable and varies from person to person. To deal with this problem, consider the following model for determining the reservation price:

$$P^R = G^*\gamma + X_2\beta_2 + \varepsilon_2, \qquad [\varepsilon_2 \sim \text{i.i.d., } N(0,\sigma_2^2)] \qquad (4.7)$$

where γ is a coefficient of the latent variable G^*, X_2 is the vector of other determinants of a taxpayer's reservation price, and β_2 is a vector of coefficients of those other variables.[2]

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[2] Heckman [1974] initially considered a similar model of labor supply in which hours worked and wages are the two endogenous variables. His model is particularly appropriate for the model of contribution demand because contributions and tax (or the price of giving) are endogenous.

Now, the contribution decision rules involving the nonnegativity constraint determines a system of behavioral equations. The model, therefore, is

$$G = \begin{cases} G^* & \text{if } G^* > 0 \\ 0 & \text{if } G^* \leq 0, \end{cases} \tag{4.8}$$

$$P = \begin{cases} P^A = P^R & \text{if } G^* > 0 \\ P^A|_{G=0} > P^R & \text{if } G^* \leq 0, \end{cases} \tag{4.9}$$

$$G^* = P^A\alpha + X_1\beta_1 + \varepsilon_1, \qquad [\varepsilon_1 \sim \text{i.i.d., } N(0,\sigma_1^2)] \tag{4.10}$$

$$P^R = G^*\gamma + X_2\beta_2 + \varepsilon_2, \qquad [\varepsilon_2 \sim \text{i.i.d., } N(0,\sigma_2^2)] \tag{4.11}$$

assuming that $\text{Cov}(\varepsilon_1, \varepsilon_2) = \sigma_{12}$. The implications of the observability conditions in equation (4.9) are straightforward. That a taxpayer decides to give a positive amount to charity (i.e., $G^* > 0$) indicates that his reservation price of giving is revealed as being equal to his applicable price of giving which is observed from the tax return data. When he does not want to give to charity ($G^* \leq 0$), however, his reservation price of giving is not revealed. All that is observable is the applicable price of giving that would have been his price if he had contributed a dollar ($P^A|_{G=0}$). In this sense, the applicable price of a nongiver is censored at the price of the first dollar of giving.

4.3 Estimation Procedures

It has been demonstrated that the consistent estimators of β_1 and β_2 in this type of simultaneous equation system can be obtained by a two-step estimation technique (see Maddala [1983, p. 199] and Amemiya [1984]) or by a maximum likelihood estimation (MLE) technique. This study will use the two-step estimation technique that was developed by Lee, Maddala and Trost (LMT) [1980]. The relative advantages of LMT's approach are twofold: computational convenience and the identifiability of the direction and magnitude of the selectivity bias.[3]

To understand how the selectivity bias is corrected by the two step estimation in this study, consider each of the following regressions of the reduced form equations. Since $P^A = P^R$ at optimum, substituting equation (4.11) in equation (4.10) generates a reduced form equation as follows:

$$G^* = \frac{X_1\beta_1}{1 - \gamma\alpha} + \frac{X_2\beta_2\alpha}{1 - \gamma\alpha} + \frac{\varepsilon_1 + \varepsilon_2\alpha}{1 - \gamma\alpha} \qquad (4.12)$$

Further, substituting equation (4.12) into (4.11) yields another reduced form equation:

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[3] The consistency of LMT's estimator was shown in their paper. Also the asymptotic distribution of the estimator was derived.

$$P^R = \frac{X_1\beta_1\gamma}{1 - \gamma\alpha} + \frac{X_2\beta_2}{1 - \gamma\alpha} + \frac{\varepsilon_1\gamma + \varepsilon_2}{1 - \gamma\alpha}. \tag{4.13}$$

Equations (4.12) and (4.13) can be rewritten for simplicity as equations (4.14) and (4.15), respectively, as follows:

$$G^* = Z\delta_1 + \upsilon, \tag{4.14}$$

where $Z \equiv [X_1 \quad X_2]$,

$$\delta_1 \equiv \begin{bmatrix} \beta_1 /(1 - \gamma\alpha) \\ \beta_2\alpha/(1 - \gamma\alpha) \end{bmatrix}, \text{ and}$$

$$\upsilon \equiv \frac{\varepsilon_1 + \varepsilon_2\alpha}{1 - \gamma\alpha},$$

$[\upsilon \sim$ i.i.d., $N(0,\sigma_\upsilon^2)$ and

$\sigma_\upsilon^2 = (\sigma_1^2 + 2\alpha\sigma_{12} + \alpha^2\sigma_2^2)/(1 - \gamma\alpha)^2]$,

and

$$P^R = Z\delta_2 + \omega, \tag{4.15}$$

where

$$\delta_2 \equiv \begin{bmatrix} \beta_1\gamma/(1 - \gamma\alpha) \\ \beta_2 /(1 - \gamma\alpha) \end{bmatrix}, \text{ and}$$

$$\omega \equiv \frac{\varepsilon_1\gamma + \varepsilon_2}{1 - \gamma\alpha}$$

$[\omega \sim$ i.i.d., $N(0,\sigma_\omega^2)$ and

$\sigma_\omega^2 = (\gamma^2\sigma_1^2 + 2\gamma\sigma_{12} + \sigma_2^2)/(1 - \gamma\alpha)^2]$.

The condition for exact identification of this type of simultaneous system is that one variable included in X_1 not be in X_2 and one variable included in X_2 not be in X_1.

Now, consider an example of the regression of the reduced form equation of G using only positive observations of G. This means that the zero observations are deleted. The biasedness of an OLS estimator is seen very easily by taking expectations of equation (4.14); that is,

$$E(G|G>0) = Z\delta_1 + E(\upsilon|\upsilon>-Z\delta_1). \qquad (4.16)^4$$

That the last term of the right-hand side is generally nonzero implies the selectivity bias of OLS estimation using positive observations only. Assuming the normality of υ, the above equation can be shown by a straightforward integration to be

$$E(G|G>0) = Z\delta_1 + \sigma_\upsilon\lambda(Z\delta_1/\sigma_\upsilon), \qquad (4.17)$$

where: $\lambda(\cdot)$ = the inverse Mill's ratio $(\phi(\cdot)/\Phi(\cdot))$ which is constructed to measure the bias due to the truncation;

$\phi(\cdot)$ = density function of normal distribution; and

$\Phi(\cdot)$ = cumulative distribution function of normal distribution.

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[4] The example is true for equation (4.14) only. One for equation (4.15) is essentially the same.

This can be written as follows:

$$G = Z\delta_1 + \sigma_\upsilon\lambda(Z\Theta) + \pi \quad \text{for } G>0 \qquad (4.18)$$

where $\Theta \equiv \delta_1/\sigma_\upsilon$, $\pi \equiv G - E(G|G>0)$. Note that $E(\pi)=0$.

The essential feature of LMT's estimation method is to consider this bias in a regression and can be summarized in the following steps. First, the expected values of the residuals that are truncated (λ) will be obtained. These expected values involve unknown parameters (i.e. Θ), but these usually can be estimated by the probit method. Then the estimated values of these variables will be introduced into the reduced form equations (4.14) and (4.15) and estimated by OLS. In other words, LMT's estimation method consists of five steps:

1. Estimate Θ by the probit MLE to get $\hat{\Theta}$.
2. Regress G on Z and $\lambda(Z\hat{\Theta})$ by OLS, using only the positive observations on G to get $\hat{G}$,
3. Regress P on Z and $\lambda(Z\hat{\Theta})$ by OLS, using only the positive observations on G to get $\hat{P}$, and
4. Regress G on $\hat{P}$ and X_1 and $\lambda(Z\hat{\Theta})$ to get $\hat{\alpha}$ and $\hat{\beta}_1$, and
5. Regress P on $\hat{G}$ and X_2 and $\lambda(Z\hat{\Theta})$ to get $\hat{\gamma}$ and $\hat{\beta}_2$.

In addition to LMT, results obtained from using a simple Tobit and a OLS estimation will also be reported to examine how sensitive the elasticities are to alternative estimation techniques.

4.4 Data and Measurement of Variables

4.4.1 Data and sample

Information on contributions and other variables is be obtained from the 1985 Individual Tax Model File produced by the Internal Revenue Service. This micro-data file consists of detailed information taken from a systematic, stratified sample of actual individual tax returns. The original file contains 108,840 returns. Approximately 20% of the file contains returns for nonitemizers. Because the focus of this study is on the behavior of low- and middle-income taxpayers and the comparison with the behavior of high-income taxpayers, the sample will be partitioned into two broad income classes based on taxpayers' Adjusted Gross Income (AGI) defined as in the Internal Revenue Code: (1) Low- and middle-income taxpayers with AGI from $1 to $75,000 and (2) Higher income taxpayers with AGI between $75,000 and $200,000.[5]

A random sampling was conducted to select 49,000 tax returns (approximately 45%) from the original file. Observations with a negative number for disposable income or AGI are eliminated from the original sample in order to avoid log of zero. Also, observations that contain a missing value in an important variable are excluded. The final sample consists of 42,311 tax returns of which 31,736 returns are for those taxpayers in low- and middle-income categories.[6]

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[5] Extremes of the income distribution (over $200,000) are dropped simply for comparability with previous work. See, for example, Schwartz [1970], Feldstein [1975], Boskin and Feldstein [1978], Clotfelter [1980].

4.4.2 Charitable contributions

The measure of charitable contributions is based on the dollar values of gifts reported in taxpayers' returns including noncash contributions. The analysis of contribution behavior of nonitemizers makes it necessary to rely on the data for 1985. This is because, except for the contributions made during 1985, ERTA' 1981 allowed a nonitemizing giver to deduct only 25% of his first $100 or $300 of contributions depending on year. The ceiling limitations make it impossible to obtain, directly from the tax returns, an accurate measure of contributions made by taxpayers who gave in excess of the ceiling. As for 1985, there is little problem in measuring the gifts made because, although a nonitemizing donor was allowed to deduct only 50% of his contributions, the tax law did not impose a ceiling on the total amount of deductible contribution made by nonitemizers. Under certain assumptions described in

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[6] The number of observations in the sample is particularly chosen due to the limitation regarding the number of observations that can be handled with the statistical package (LIMDEP) that is used for this study. The LIMDEP program can analyze a data set of 32,000 observations on a personal computer.

Appendix, noncash contributions by a taxpayer are taken into consideration in calculating the price of giving.

4.4.3 Price of giving

The price of giving is defined here as the after-tax foregone consumption per dollar of giving. Under a tax regime which allows full deductibility of charitable contributions, the basic price of giving for taxpayers facing the marginal tax rate (τ) is $P = 1 - \tau$. In contrast, $P = 1$ for a nonitemizer. However, $P = 1 - 0.5\tau$ for the year 1985 during which a nonitemizer was allowed to deduct 50% of his contribution made without a ceiling limitation.[7]

Unlike previous studies, the price measure that is used in this study is the last-dollar price of giving. The last-dollar price is defined as the price applying to an individual taxpayer's last dollar of giving. This marginal price of giving is obviously endogenous and, therefore, more appropriate for the models that are used in this study. However, the first-dollar price of giving is used in the conventional OLS estimation and Tobit maximum likelihood estimation that are conducted for comparison purposes.

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[7] For 1984, $p = 1 - \dfrac{[0.25\tau \times \min\{G, 300\}]}{G}$,

where G denotes the amount actually contributed by a nonitemizing taxpayer. The price of giving by a nonitemizer is dependent not only on the marginal tax rate but on the amount contributed. However, it is not possible to observe G directly from tax returns when $G > \$300$. This dependence of price variable on an unobservable variable, G, is another reason why this study uses 1985 data.

Complications may arise in calculating the price of giving when gifts are assets which have appreciated in value. Following Feldstein [1975], Feldstein and Clotfelter [1976], and Clotfelter [1986] this feature will be taken into account in the estimation. Appendix 1 describes the modified formula for the price of giving.

4.4.4 Income

The basic income measure in the present study is disposable income (DY) which is defined as the total income an individual has before any deductions for tax purposes. Therefore, disposable income adds back (i) any cash income items that are excluded from Gross income (as defined in the Internal Revenue Code) in one's Form 1040 and (ii) any statutory adjustments arriving at AGI.[8] Also, negative amounts, in aggregate, for capital gains, business income and partnership income are eliminated. Disposable income is calculated as the total income (adjusted as above) minus the tax liability that would have been due had no contributions been made. This definition of income will make income an exogenous measure. In particular, disposable income is a more appropriate measure for the definition of income as a determinant of the applicable price of giving (see Equation (4.6) in Chapter 4).

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[8] Because of their different characteristics, alimony paid and penalty on early withdrawal of savings are not added back.

The model used in this study requires a different measure of income to estimate the equation for reservation price (Equation (4.7)). Being aware that his price of giving is tax-determined, a utility maximizing taxpayer, on the verge of contribution decision, is likely to conceive of a different measure of income that is most closely associated with his tax liability. In this context, AGI is adopted as a determinant of reservation price.[9]

4.4.5 Personal characteristics

Besides price and income, personal or demographic characteristics of donors may affect their charitable giving behavior. Variables are included in the giving models in order to reflect these possible effects. It seems reasonable to expect the personal propensity of giving to increase as one gets older. The present study includes an age dummy (AGE) to measure how the age of the head of household is important in exploring differences in giving. Dummy variables for marital status (MAR) and the number of dependent (DEP) in a taxpayer's household will be added to reflect demographic differences among taxpayers. These demographic variables have been found to be important factors in explaining differences in the level of charitable contributions in the majority of empirical studies on charitable giving.

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[9] This choice of income measure also satisfies the identification condition for the two-step estimation.

CHAPTER 5
EMPIRICAL RESULTS

The testable hypotheses of this study were presented in Chapter 3. Chapter 4 developed the empirical models for the main hypotheses and discussed various estimation techniques that are used in this study to test the hypotheses. This chapter presents the results of the empirical tests of the hypotheses and reports the conclusions reached regarding each of the previously specified hypotheses. Thus, the results are analyzed and interpreted in hypothesis order.

5.1 Price Elasticity Estimates

Using the data for 1985, the parameters of interest are estimated in separate equations for the lower and higher income classes to assess whether contributions by low- and middle-income taxpayers (with income of $1 to $75,000) are as responsive to tax incentives as contributions by high-income taxpayers (with income over $75,000 to $200,000). Further, as discussed in Chapter 4, the results from using three different estimation procedures are compared to assess the sensitivity of the estimates to the specification of the models or to alternative estimation techniques. Following previous studies, borderline itemizers are eliminated from the sample in order to facilitate the comparison of the results of this study with those of previous studies unless the test requires that they be included.[1]

The first two hypotheses that are specified in Chapter 3 regarding the price effect are restated as follows:

H1: The demand for charitable contributions by taxpayers in the low- and middle-income classes is not price-elastic.

H2: The demand for charitable contributions by taxpayers in the low- and middle-income classes is as elastic as the demand for charitable contributions by taxpayers in the high-income class to the price of giving.

5.1.1 All-taxpayers and itemizers

All-taxpayers.

Table 3 shows the results of the coefficient estimation of the log-linear giving demand specifications for all taxpayers in the low- and middle-income classes including both itemizers and nonitemizers.[2] The price elasticity estimate for this group of taxpayers is found to be significantly higher than one in absolute value across all estimation procedures. Although the LMT procedure that estimates the simultaneous equations Tobit (SET) model

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[1] See Clotfelter [1980] for a discussion of the bias arising from including borderline itemizers in a sample.

[2] For convenience, a model using both itemizers and nonitemizers in estimation is referred as an all-taxpayers model to contrast with an itemizers model or a nonitemizer model.

Table 3
Coefficient estimates: Charitable contribution equations, Low- and middle-income taxpayers, 1985

	All-taxpayers				Itemizers			
	OLS	TOBIT	SET[a]		OLS	TOBIT	SET[a]	
*ln*P	-3.66	-3.63	-2.53		-1.35	-1.34	-2.45	
	(.09)	(.13)	(.30)		(.11)	(.12)	(.31)	
*ln*DY	.66	1.24	.96		.76	1.08	.83	
	(.02)	(.03)	(.03)		(.02)	(.02)	(.03)	
MAR	.38	.37	.28	.01	.27	.26	.22	.01
	(.04)	(.04)	(.03)	(.002)	(.04)	(.04)	(.03)	(.003)
AGE	.56	.77	.50	-.12	.37	.41	.44	-.02
	(.04)	(.05)	(.04)	(.002)	(.05)	(.05)	(.11)	(.005)
DEP	.09	.10	.09	.01	.88	.10	.10	.004
	(.019)	(.01)	(.01)	(.001)	(.01)	(.01)	(.01)	(.001)
ln(G+10)				.01				.02
				(.002)				(.003)
*ln*AGI				-.12				-.14
				(.002)				(.004)
CONS-TANT	-2.66	-9.02	-4.78	1.01	-2.68	-6.15	-3.25	1.19
	(.13)	(.22)	(.36)	(.021)	(.15)	(.21)	(.34)	(.039)
λ			1.12	-1.04			1.39	-.22
			(.09)	(.005)			(0.12)	(.014)
Adj. R^2	.42	–[b]	–[b]	–[b]	.29	–[b]	–[b]	–[b]
N	23,497				13,096			

Note: 1. All coefficient estimates are significant at .05 level.
2. Standard errors are in parentheses.

[a]: For the SET model, the equation for the reservation price ($lnP = a_0 + a_1 ln(G+10) + a_2 lnAGI + a_3 MAR + a_4 AGE + a_5 DEP + \varepsilon$) is estimated in addition to the contribution demand equation (3.3).

[b]: The conventional R^2 measure is not applicable.

yields a slightly lower price elasticity estimate than OLS or Tobit MLE procedures, it is still high enough to reject the null hypotheses of b = -1 (t = -5.05). This finding of a high price elasticity estimate supports the argument made by Feldstein and his collaborators that giving by low- and middle-income taxpayers is responsive to the price change arising from the deduction for charitable contributions. Particularly, the price elasticity estimates from using OLS and Tobit models are consistent with those of previous studies that were done using survey data whereby the samples included basically all taxpayers from the itemizers and nonitemizers groups.[3] Since the OLS and Tobit estimators yield substantially identical price elasticities, while a considerable difference is found between estimates of the Tobit model and the SET model, the bias problem arising from endogeneity appears more serious than selectivity bias as far as the price elasticity estimate is concerned. On the other hand, all of the coefficient estimates of other variables in the contribution demand equation are statistically significant at a .0001 level and the signs are as expected. Note that coefficients of λ, which shows the selectivity bias, are also significant in the demand model.

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[3] The price elasticity estimates of the all-taxpayers model using OLS and Tobit range from -2.25 to -3.27 in previous studies. Exceptions to this general statement are Feldstein and Clotfelter [1976] who find price elasticities of -1.5 and Reece [1979] who reported -1.19. See also Table 1 in Chapter 2.

Recall that, in Chapter 4, a simultaneous equations Tobit model requires the estimation of an equation for the reservation price of giving. The right-hand side column of the SET model in Table 3 displays coefficient estimates in the equation for the reservation price. In this second equation of the simultaneous model, all coefficient estimates are statistically significant at .0001 level. Note that the sign of the coefficient on *ln*(G+10) is positive while that for *ln*AGI is negative. At a glance, it seems logical to view the reservation price as a decreasing function of giving and also an increasing function of income for an individual taxpayer since decreasing MRS is required for utility maximization.[4] However, the regression of equation (4.11), in fact, estimates the relation between the applicable price and regressors including the level of giving and income because the reservation price of giving of a taxpayer is not observed until it equals the applicable price at optimum where a positive amount of giving is observed. As a consequence, it is expected that the price is an increasing function of giving and a decreasing function of income. The results confirm this expectation.

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[4] Note that the reservation price is nothing but the MRS of giving for other consumptions. See also equation (4.1).

Itemizers.

Since previous studies using tax return data included only itemizers in their samples, a separate regression was run for itemizers only. The OLS estimation and the Tobit MLE generate the price elasticity estimates of -1.35 and -1.34, respectively, for low- and middle-income itemizers. These estimates are strikingly similar to those reported for the itemizers models in previous studies which generally from range -1.09 to -1.34.[5] However, The SET model generates a much higher price elasticity of -2.45 for itemizers. Again, the comparison of price elasticity estimates using different estimation procedures indicates the presence of the significant endogeneity bias in the OLS and Tobit estimates.

High-income taxpayers vs. low-and-middle income taxpayers.

To test Hypothesis 2, models for high-income taxpayers are estimated. Regressions and coefficients estimates for the all-taxpayers model and the itemizers model are presented in Table 4. For each model, a t-test was used to assess whether there is any significant difference in the price elasticity between the high-income taxpayers and low- and middle-income taxpayers. Hypothesis 2 is not rejected

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[5] See also Table 2 in Chapter 2. To this author's knowledge, there is no published study that estimated contributions demand function specified with a Tobit model using itemizers' tax return data.

Table 4
Coefficient estimates: Charitable contributions equations, High-income taxpayers, 1985

	All-taxpayers				Itemizers			
	OLS	TOBIT	SET[a]		OLS	TOBIT	SET[a]	
*ln*P	-2.13 (.14)	-2.13 (.14)	-2.75 (1.31)		-1.39 (.15)	-1.39 (.15)	-3.05 (1.02)	
*ln*DY	.72 (.03)	.72 (.03)	.70 (.08)		.71 (.03)	.71 (.03)	.73 (.06)	
MAR	.79 (.06)	.79 (.06)	.19* (.33)	-.05 (.03)	.76 (.06)	.76 (.06)	.24* (.22)	-.02* (.019)
AGE	.48 (.05)	.48 (.05)	.34 (.11)	-.05 (.01)	.56 (.05)	.56 (.05)	.28 (.13)	-.04 (.012)
DEP	.13 (.01)	.13 (.01)	.06* (.04)	-.01 (.00)	.12 (.01)	.12 (.01)	.07 (.03)	-.01 (.002)
ln(G+10)				.11 (.01)				.11 (.007)
*ln*AGI				-1.02 (.02)				-.18 (.013)
CONSTANT	-3.13 (.42)	-3.13 (.42)	-1.25* (1.69)	1.30 (.25)	-2.53 (.42)	-2.53 (.42)	-1.80* (1.11)	1.10 (.15)
λ			3.63* (3.34)	-.29* (.35)			-3.08* (2.20)	.05* (.19)
Adj. R^2	.11	–[b]	–[b]	–[b]	.10	–[b]	–[b]	–[b]
N	7,690				7,508			

Note: Standard errors are in parentheses.

[a]: For the SET model, the equation for the reservation price ($lnP = a_0 + a_1 ln(G+10) + a_2 lnAGI + a_3 MAR + a_4 AGE + a_5 DEP + \varepsilon$) is estimated in addition to the contribution demand equation (3.3).

[b]: The conventional R^2 measure is not applicable.

*: not significant at .05 level.

either for the all-taxpayers model (t = .17) or for itemizers model (t = .20). That is, contrary to the conventional belief, there is no statistically significant difference in the price elasticity estimate between high-income taxpayers and low- and middle-income taxpayers. OLS and Tobit estimators produce even higher price elasticity estimates for the low- and middle-income taxpayers model than for the high-income taxpayers model. Although the difference becomes bigger, the findings from the estimation of the itemizers model confirm the findings from the all-taxpayers model (t = .57).[6]

In summary, the results of the hypothesis tests suggest that taxpayers in low- and middle-income classes are as sensitive to tax incentives in making their contribution decisions as those in high-income classes. Not only are the price elasticity estimates for the low- and middle-income taxpayers significantly greater than 1 in absolute value but also no statistically significant differences in the price elasticity estimates are found between those two groups of income classes. These findings have an important tax policy implication regarding extending the deductibility of charitable contributions to nonitemizers of which the majority are low- and middle-income taxpayers. The policy implication regarding nonitemizers is discussed in the next section.

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[6] Approximately 98% of the taxpayers in the high income classes (i.e., income of $75,000 - $200,000) are itemizers. Thus, comparing the price elasticities of only nonitemizers in low- and middle-income classes with those in high income classes is practically meaningless.

5.1.2 Nonitemizers

In order to examine the responsiveness of giving by nonitemizers to the price variation that was induced by the DCD provisions, the contribution demand equation is separately estimated for nonitemizers. The results of the regression and coefficient estimation procedures are reported in Table 5. Overall, the behavior of the coefficient estimates for the nonitemizers model is strikingly different from those for the all-taxpayers model and the itemizers model. Although statistically insignificant, the SET estimate of price elasticity even takes on a positive value of 1.23. Also, in general, other coefficient estimates are quite unstable across the different estimation models employed.

First, the OLS results show a quite high price elasticity estimate (-2.89) with a relatively low standard error (.67) for nonitemizers. On the other hand, both Tobit and SET models generated high standard errors (1.44 and .85, respectively) so that the null hypothesis of the price elasticity of being minus one cannot be rejected. Finding a very low price elasticity estimate with a high standard error may not seem surprising because many nonitemizers

Table 5
Coefficient estimates: Charitable contributions equations, Nonitemizers, 1985

	OLS	TOBIT	SET[a]	
*ln*P	-2.89	-.92*	1.23*	
	(.67)	(1.44)	(.85)	
*ln*DY	.56	1.68	.29	
	(.04)	(.10)	(.14)	
MAR	.25	.09*	.20	.09
	(.04)	(.09)	(.04)	(.05)
AGE	.76	1.21	.30	.01*
	(.05)	(.10)	(.10)	(.03)
DEP	-.03*	-.07	.03**	.02
	(.02)	(.03)	(.02)	(.01)
ln(G+10)				-.27*
				(.20)
*ln*AGI				-1.13
				(.04)
CONSTANT	-1.82	-13.5	2.95**	2.87
	(.36)	(.85)	(1.60)	(1.53)
λ			-.43*	-.43*
			(.36)	(.27)
Adj. R^2	.17	–[b]	–[b]	–[b]
N	10,401			

Note: Standard errors are in parentheses.

[a]: For the SET model, the equation for the reservation price ($lnP = a_0 + a_1 ln(G+10) + a_2 lnAGI + a_3 MAR + a_4 AGE + a_5 DEP + \varepsilon$) is estimated in addition to the contribution demand equation (3.3).

[b]: The conventional R^2 measure is not applicable.

*: not significant at .05 level.

**: not significant at .10 level.

might not be aware of the existence of the provisions even though the DCD provisions had been in effect since 1982 or the limited percentage (50%) of deduction allowed might not be perceived as an tax incentive high enough to stimulate contributions among nonitemizers.

Notwithstanding the above argument the positive price elasticity of 1.23 estimated with the SET model is a quite puzzling result. A possible explanation is that many nonitemizers might have simply viewed the deductions for their charitable contributions as a source of additional, windfall income rather than as incentives to reduce their price of giving. Thus the responsiveness of giving to the price variation became less uniform among nonitemizers or this pseudo-income effect overrode the price effect to drive the price elasticity estimate over zero and into the positive domain.

Another important source of the instability of the price elasticity estimates and their high standard errors is the particular characteristics of the DCD provisions. The sample of nonitemizers that is used in this study inevitably includes nonitemizers whose itemization decisions were not purely exogenous with respect to contributions. Unlike pre- and post-ERTA tax regimes, ERTA '81 made some taxpayers find it advantageous not to itemize even though the sum of their contributions and non-contribution deductible expenditures exceeded their zero bracket amount since a nonitemizer was also allowed to deduct a part or all of his charitable contributions depending on the year of contribution.[7] A taxpayer would use a standard deduction and choose to remain a nonitemizer if his direct charitable contributions (DCD) exceeded his excess itemized deductions (EID). Under the 1985 tax law in particular, a nonitemizer was allowed to deduct 50% of his contributions. The deduction rule for a nonitemizer under the 1985 tax law can be represented as follows:

$$NG + G - ZBA < \tfrac{1}{2}G \qquad (5.1)$$

where: G = the taxpayer's total contributions;

NG = the taxpayer's noncontribution deductible expenditures; and

ZBA = a zero bracket amount.

However, in the absence of the DCD provisions, a taxpayer would choose to itemize if

$$NG + G - ZBA \geq 0. \qquad (5.2)$$

Rearranging terms and combining inequalities (5.1) and (5.2) yields:

$$ZBA - NG \leq G < 2(ZBA - NG). \qquad (5.3)$$

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[7] See Footnote 3 of Chapter 1 for the deduction rules.

A taxpayer with this range of contributions would have been an itemizer had the DCD provisions not in effect in 1985 and is called a borderline nonitemizer. Inequality (5.3) clearly shows the upper and lower bounds of contributions by a borderline nonitemizer. Notice that the itemization decision of a borderline nonitemizer is endogenous with respect to their contributions. It follows immediately that the range of amounts that a borderline nonitemizer can contribute without changing his itemization status is ZBA - NG (i.e., 2(ZBA - NG) - (ZBA - NG)). Let this range be R. Then R is a function of Y, i.e., R = R(NG(Y)) since ZBA is a constant and NG = NG(Y). A reasonable assumption that $NG'>0$ for all Y will lead to $R'<0$.[8] One can easily see that not only the range R becomes smaller but also the lower and the upper bounds of the range become lower as income increases. Therefore, a borderline nonitemizer may lower his contributions as long as he keeps his contributions within the range of (ZBA - NG) and thereby remaining as a borderline nonitemizer.

Stated differently, for a borderline nonitemizer,

$$\frac{\partial G}{\partial Y} < 0. \tag{5.4}$$

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[8] Tax return data support the validity of this assumption. Average itemized deductions claimed by itemizers excluding the contributions deduction monotonically increases as income increases. See U.S., Internal Revenue Service, "Individual Income Tax Returns 1986," Statistics of Income (1989).

Inequality (5.4) implies that the effect of real income change on nonitemizers' contributions is negative. In this regard, giving is an inferior good for a nonitemizer. The inferiority of contributions by nonitemizers explains the strikingly low income elasticity estimate of .29 for nonitemizers with SET model in Table 5. The negative income elasticity of borderline nonitemizers would reduce the income elasticity estimate of whole nonitemizer group toward zero and the opposite direction of the income effect would result in the high standard error relative to those found in itemizers and all-taxpayers models.

The existence of borderline itemizers also make the sign of the price elasticity ambiguous. This can be explained with the basic relationship between contributions and its primary determinants:

$$G = G(P,Y(P)),$$

where G, P, and Y are previously defined. Differentiating above equation holding Y constant yields a decomposition of the total effect of a price change due to the deduction into two effects as follows:

$$\frac{dG}{dP} = \frac{\partial G}{\partial P} + \frac{\partial G}{\partial Y} \cdot \frac{\partial Y}{\partial P} \qquad (5.5)$$

Since giving is an inferior good (i.e., $\partial G/\partial Y < 0$) and real income decreases as price increases (i.e., $\partial Y/\partial P < 0$), the second term of equation (5.5) takes a positive value implying that income effect of deductions on contributions is negative. Thus, if the second term (i.e., income effect) overrides the first term (i.e., substitution effect), dG/dP will take a positive value, and accordingly, the price elasticity ($(dG/dP)\cdot(P/G)$) will be positive.[9] As a consequence, the presence of borderline nonitemizers and the failure to separate them from the sample of nonitemizers may contaminate the price elasticity estimates for nonitemizers. The positive price elasticity of borderline nonitemizers may push the price elasticity estimate for nonitemizers toward a positive value.

Unlike borderline itemizers, however, there is no way of distinguishing borderline nonitemizers from other nonitemizers in tax return data because tax returns filed by nonitemizers do not include information on noncontribution deductible items. Therefore, it appears premature to make any policy decision regarding the deduction for charitable giving by nonitemizers based on the price elasticity estimates until an econometric technique is further developed to identify the exact effect of including borderline nonitemizers in the sample.

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[9] This implies that giving may be a Giffen good to a borderline nonitemizer.

5.2 Itemization Effect

Hypotheses that are related to the effect of itemization status on charitable contributions are restated as follows:

H3: There is no significant itemization effect independent of other effects.
H4: There is no difference in giving behavior between itemizers and nonitemizers.

To test for the presence of an itemization effect (H3), as defined in Chapter 3, equation (3.4) is estimated using alternative estimation procedures. Table 6 summarizes the test results. The LMT procedure with the simultaneous equations Tobit model generates a statistically significant coefficient estimate for the intercept dummy (1.44) which shows the difference of constant term between itemizers and borderline itemizers (t = 22.31).[10] The finding implies that the shift of itemization status has a significant effect on giving by individual taxpayers in low- and middle-income classes. Under the ERTA tax regime, the itemization effect is not expected to be significant because not only itemizers but also nonitemizers were allowed to deduct their charitable contributions. Benefits obtained by nonitemizers from utilizing deductions for charitable contributions might

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[10] A significant difference of constant term was also found between nonitemizers and borderline itemizers (t = 16.47).

Table 6
Coefficient estimates: Test for Itemization Effect, Low- and middle-income taxpayers, 1985

	OLS	TOBIT	SET[a]	
*ln*P	-1.29	-1.25	-1.90	
	(.11)	(.12)	(.30)	
*ln*DY	.76	1.07	.78	
	(.02)	(.02)	(.03)	
MAR	.26	.24	.20	.014
	(.03)	(.04)	(.03)	(.003)
AGE	.36	.39	.42	-.014
	(.05)	(.05)	(.04)	(.004)
DEP	.09	.09	.09	.004
	(.01)	(.01)	(.01)	(.001)
ln(G+10)				.023
				(.003)
*ln*AGI				-.126
				(.003)
D	1.58	1.78	1.44	-.075
	(.06)	(.07)	(.06)	(.006)
CONSTANT	-2.67	-6.01	-2.62	1.043
	(.15)	(.21)	(.32)	(.028)
λ			1.09	-.165
			(.13)	(.010)
Adj. R^2	.31	–[b]	–[b]	–[b]
N	13,645			

Note: 1. All coefficient estimates are significant at .01 level.
2. Standard errors are in parentheses.

[a]: For the SET model, the equation for the reservation price $(\mathit{ln}P = a_0 + a_1\mathit{ln}(G+10) + a_2\mathit{ln}AGI + a_3MAR + a_4AGE + a_5DEP + \varepsilon)$ is estimated in addition to the contribution demand equation (3.4).

[b]: The conventional R^2 measure is not applicable.

make it relatively less advantageous for itemizers to itemize their contribution deductions so that the number of borderline itemizers and the magnitude of the change in contributions upon switching the itemization status became smaller.[11] Nevertheless, the results show evidence that nonitemizers' giving is responsive to the change of itemization status regardless of the presence of the price effect. An important tax policy implication emerging from this evidence is that lowering the zero bracket amount or setting a separate deduction floor for charitable contributions below the current standard deduction may induce more taxpayers to increase their giving because the number of taxpayers who face dual optima will increase as the deduction floor becomes lower.

Hypothesis 4 is to examine whether the itemization effect is economically significant at aggregate level and whether there is any structural difference in giving behavior between itemizers and nonitemizers. To test this hypothesis, coefficient estimates of equations for itemizers (Table 4) and nonitemizers (Table 5) are used to assess whether there is any significant difference of a corresponding parameter between the two groups of taxpayers. T-statistics show that three parameters of interest are significantly different between two groups at .01 level;

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[11] See also footnote 5 in Chapter 3.

t=3.90 for intercept, t=4.05 for price elasticity, and t=3.78 for income elasticity. The rejection of Hypothesis 4 directly contradicts the conclusion of Boskin and Feldstein (1978) who reported similar constant terms in magnitude between itemizers and nonitemizers. Unlike the sample of itemizers that does not include the borderline itemizers for the test of hypothesis 4, however, the sample of nonitemizers does include the borderline nonitemizers thereby contaminating parameter estimates for nonitemizers model. As noted in the discussion of results from the estimation of nonitemizers model, the inclusion of borderline nonitemizers in the sample would bias the price elasticity estimate for nonitemizers upward over zero and the income elasticity estimate downward toward zero and make standard errors bigger than would have been without including them in the sample. This bias introduced by the failure to exclude borderline nonitemizers from the sample appears to be responsible for the significant difference of parameter estimates between the two groups.

The seriousness of the distortion due to the introduction of borderline nonitemizers is not clearly known because it depends on the number of nonitemizers who would have not switched their itemization status had the DCD provisions not been effective. Even so, an analysis of Statistics of Income data indicates a substantial number of itemizers switched their itemization status to nonitemizers during ERTA years. Table 7 displays descriptive statistics on the number of returns under ERTA. Panel A contains the number of returns filed by taxpayers including both givers and nongivers and Panel B shows the number of returns by givers only. The total number of returns filed both by itemizers and nonitemizers shows a modest increase throughout the five-year period in both panels. However, a breakdown of returns by income class gives a different perspective. As shown in Panel C, while the proportion of itemizers in all filers is fairly stable over the years, the itemizing givers have generally been losing their share among total givers. This phenomena is more apparent at low- and middle-income levels particularly during 1985 and 1986 when the ceiling limitation of a deduction for contributions by nonitemizers were substantially increased.[12] At the low-income level, the proportion of returns by itemizing givers shows a 6.1% decline from 1984 to 1986 while that of returns filed by itemizing filers decreased by only 1.1% during the same time period. This decreasing share of itemizing givers in total givers suggests that increasing number of itemizing givers have switched their itemization status to nonitemizers over the years under ERTA tax regime.

The examination of percentage changes in the absolute number of returns further supports the above proposition.

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[12] See footnote 3 of Chapter 1.

Table 7
Number of returns by income class and itemization, 1982 - 1986

000's omitted

itemization status	income class	year				
		1982	1983	1984	1985	1986
A: All filers						
itemizer[(a)]	\$0 - \$30	17,289	17,415	17,621	17,015	16,482
	\$30 - \$75	14,745	16,215	18,580	20,421	21,251
	\$75 - \$200	1,232	1,404	1,761	2,119	2,590
	All	33,433	35,231	38,203	39,848	40,667
nonitemizer[(b)]	\$0 - \$30	58,969	58,103	58,068	56,411	58149
	\$30 - \$75	2,892	2,945	3,116	3,546	4,149
	\$75 - \$200	41	42	49	53	72
	All	61,904	61,090	61,236	61,812	62,378
B: Givers						
itemizer[(c)]	\$0 - \$30	15,043	15,038	15,124	14,544	13,904
	\$30 - \$75	14,108	15,437	17,534	19,279	19,972
	\$75 - \$200	1,198	1,364	1,715	2,054	2,517
	All	30,511	32,030	34,608	36,162	36,714
nonitemizer[(d)]	\$0 - \$30	17,657	20,659	20,947	22,826	24,928
	\$30 - \$75	1,603	1,828	1,942	2,392	3,052
	\$75 - \$200	23	25	31	38	58
	All	19,284	22,513	22,921	25,359	28,041

Table 7. continued

C: Proportion of itemizers in all taxpayers (%)

	income class	1982	1983	1984	1985	1986
Filer $\frac{a}{a+b}$	\$0 - \$30	22.7	23.1	23.3	23.2	22.1
	\$30 - \$75	83.5	84.6	85.6	85.2	83.7
	\$75 - \$200	96.8	97.2	97.3	97.6	97.3
	All	35.1	36.6	38.4	39.2	39.5
Giver $\frac{c}{c+d}$	\$0 - \$30	46.0	41.9	41.9	38.9	35.8
	\$30 - \$75	89.8	89.4	90.0	89.0	86.7
	\$75 - \$200	98.1	98.2	98.2	98.2	97.7
	All	61.3	58.7	60.2	58.8	56.7

Table 8 presents the percentage changes of returns over consecutive two years which are calculated based on the numbers in Table 7. While the total number of returns filed by taxpayers grows at a modest rate of 2.0% on average over the four changing-year periods, the break-down the average into givers (6.8%) and nongivers (-3.8%) shows a sharp contrast. Overall, ERTA '81 seems to have stimulated an increasing number of taxpayers to contribute or, at least, claim deductions for their contributions. It is not surprising to see a further significant difference in the percentage change of returns between givers and nongivers among nonitemizers (9.9% and -6.8%, respectively) because DCD provisions were designed to affect nonitemizers mostly. A concern is expressed about the difference in the growth rates between givers (4.8%) and nongivers (7.9%) among itemizers. It does not seem unreasonable to take the rate of 7.9% for granted as a growth rate of itemizers as a whole since, during the ERTA years, there was no other major tax law change that would affect the growth rate of itemizing nongivers and itemizing givers differently. The DCD provisions appears the main reason for the observed difference between these two groups of taxpayers. Thus, an increasing number of givers, who previously itemized their contributions, dropped out of itemizers group to join the nonitemizers group and thereby further increasing the growth rate of the number of returns filed by nonitemizing givers.

Table 8
Percentage change in number of returns, 1982 - 1986

itemization status	income class ($1,000)	changing year				avg
		1982-83	1983-84	1984-85	1985-86	
		A: Givers				
itemizers	$0 - $30	-0.0	.6	-3.8	-4.4	-1.9
	$30 - $75	9.4	13.6	9.9	3.4	
	$75 - $200	13.9	25.7	19.7	22.5	
	All	5.0	8.0	4.5	1.5	4.8
nonitemizers	$0 - $30	17.0	1.4	9.0	9.2	9.2
	$30 - $75	14.0	6.2	23.2	27.6	
	$75 - $200	8.7	24.0	22.6	52.6	
	All	16.7	1.8	10.6	10.6	9.9
givers total		9.5	5.5	6.9	5.3	6.8
		B: Nongivers				
itemizers	$0 - $30	5.8	5.0	-1.0	4.3	3.5
	$30 - $75	22.1	34.4	9.2	12.0	
	$75 - $200	17.6	15.0	39.1	12.3	
	All	9.5	12.3	2.5	7.2	7.9
nonitemizers	$0 - $30	-9.4	-.9	-9.5	-1.1	-5.2
	$30 - $75	-13.3	5.1	-1.7	-4.9	
	$75 - $200	-5.6	5.9	-16.7	-6.7	
	All	-9.5	-.7	-4.9	-5.8	-6.8
nongivers total		-8.3	.2	-4.2	-4.6	-3.8
filers total		1.0	3.2	2.2	1.4	2.0

A further breakdown of the table along income classes gives a clearer view of the effect that DCD rules had on the two groups. First, for the itemizing givers in low-income class, the absolute number of returns has decreased at an increasing rate during the last two change periods (1984 to 1985 and 1985 to 1986). Again, the much more favorable deduction rules for nonitemizing givers accelerated the departure from itemization especially at the lower income levels. Second, a substantially higher percentage of nonitemizers in middle- and high-income classes claimed the nonitemizers' deduction during 1985 and 1986 in comparison with the percentage of those in the low-income class. It implies that the nonitemizers deduction rules attracted taxpayers with higher incomes more than those with lower incomes, which is contrary to the expectation of Congress upon the enactment of DCD provisions. This observation is further supported by the results from the analysis of the contribution statistics.

In Table 9, average dollar amounts contributed by givers and the percentage changes of average giving are presented based on the numbers in Table 2. Notice the striking difference in percentage change of average giving between itemizers and nonitemizers. While average giving by itemizers decreased (at low- and middle-income levels) and increased at a very low rate (at high-income levels) during the 1985-86 period, nonitemizers' average contributions

Table 9
Average giving by givers and percentage change, 1984 - 1986

itemization status	income class ($1,000)	average giving 1984	average giving 1985	average giving 1986	percentage change 1984-85	percentage change 1985-86
itemizer	$0 - $30	756	779	732	3.0	-6.0
	$30 - $75	1,113	1,141	1,129	2.4	-1.1
	$75 - $200	3,223	3,236	3,281	.4	1.4
	avg of all	1,217	1,326	1,466	9.0	10.6
nonitemizer	$0 - $30	n/a	355	425	n/a	19.7
	$30 - $75	n/a	522	827	n/a	58.4
	$75 - $200	n/a	777	2,362	n/a	204.0
	avg of all	n/a	372	474	n/a	27.4

n/a : not available

increased significantly during 1986. Since the amount contributed by an itemizer is generally higher than a nonitemizer's giving at the same income level, a switch of itemization status from being an itemizer to being a nonitemizer would boost the average giving by nonitemizers. The effect of the change of itemization status becomes more visible as an income class moves upward. While average giving by nonitemizers in the low-income class increased by 19.7% during 1986, giving by middle-income itemizers during the same year ($827) was more than the average amount contributed by high-income itemizers during the previous year ($777). The most striking change during the 1985-86 period is that giving by high-income nonitemizers more than tripled on average. Notice that, while even average giving by high-income nonitemizers fell short of that by low-income itemizers during 1985, high-income nonitemizers contributed more than twice as much as middle-income itemizers during 1986. This tremendous increase in average giving among nonitemizers could not be possible unless there had been the a large migration across the itemization line.

In summary, the analysis of the Statistics of Income data provides evidence that DCD provisions resulted in substantial increase not only in the number of nonitemizers but also in the amount of contributions among nonitemizers. Owing to the structure of the nonitemizers deduction rules described previously, these rules permitted borderline nonitemizers to maximize their utility by opting not to itemize their contributions. Thus, the influx of borderline nonitemizers into the data of nonitemizers might cause seemingly irregular behavior of the price and income elasticities for nonitemizers. As a consequence, statistically significant differences were found both in the intercept term and the slope coefficients between itemizers and nonitemizers models. Therefore, the results of the test for Hypothesis 4 seems to demand a cautious interpretation.

CHAPTER 6
SUMMARY AND CONCLUSION

This chapter summarizes the study, presents a discussion of the study's results, and closes with limitations on the research presented and suggestions for future research.

6.1 Summary of Purpose

The primary objective of this study, as stated in Chapter 1, was to answer the following research questions: (1) Is giving by taxpayers in low- and middle-income classes responsive to the deduction incentives provided by tax laws? (2) Does itemization have a significant independent effect on the decision to make a charitable contribution? The importance of the issues are twofold: academic reasons and tax-policy implications.

First, empirical studies have not formed a high degree of consensus regarding the incentive effect of a tax deduction for charitable contribution on low- and middle-income taxpayers. As for the itemization effect, studies reported contradictory findings. This lack of consensus observed in empirical studies calls for a further examination of this area of research.

Second, there was considerable impetus behind the most recent proposals to change the deduction rules for charitable contributions. The results of empirical analyses of charitable giving may have significant implications for the decisions made by tax policy makers and charities. In particular, the decisions involving the initial adoption of a deduction for charitable giving by nonitemizers by Congress in 1981 and the subsequent abandonment of the provision appears to be largely affected by the scholarly input supported by empirical findings. Also, the concerns of charities regarding the possible adverse effect of TRA '86 on giving is based on the belief that taxpayers are sensitive to taxes in determining the amount of their charitable contributions. This conclusion is mainly the product of scholarly effort.

With this in mind, the study attempted to expand knowledge about how income taxes affect charitable giving in the following three ways. First, the analysis focuses on the contribution behavior of taxpayers in low- and middle-income classes including nonitemizers who were first allowed to deduct their charitable contributions under ERTA '81. Secondly, the comparison of the estimates of the model for nonitemizers and those for itemizers should give new insight into the examination of responsiveness to the tax incentive of giving by taxpayers at low- and middle-income levels. Lastly, the study will present more accurate estimates of models of giving behavior for individuals at low- and middle-income levels. This is made possible by the availability of new tax return data for nonitemizers and the development of a more sophisticated estimation technique.

6.2 Discussion of Results and Implications

Four testable hypotheses, as specified in Chapter 3, were developed to answer the research questions.

H1: The demand for charitable contributions by taxpayers in the low- and middle-income classes is not price-elastic.

H2: The demand for charitable contributions by taxpayers in the low- and middle-income classes is as elastic as the demand for charitable contributions by taxpayers in the high-income class to the price of giving.

H3: There is no significant itemization effect independent of other effects.

H4: There is no difference in giving behavior between itemizers and nonitemizers.

To test the hypotheses, a Simultaneous Equations Tobit model is constructed and analyzed theoretically and empirically. This model explicitly incorporates, in the contribution demand function, the selectivity bias arising from estimating a censored regression and the simultaneous bias due to the dependence of the price of giving on the level of contributions. A two-step estimation technique is used to estimate the price elasticities of giving on samples of taxpayers selected from the 1985 Individual Tax Model File in order to assess the effectiveness of the deduction policy under the Economic Recovery Tax Act of 1981 that allowed tax deductions for charitable contributions by low- and middle-income taxpayers, including nonitemizers.

The empirical results of the study generally confirm the findings of the prior studies that estimated high price elasticities for giving by low- and middle-income taxpayers. Also, no statistically significant differences in the price elasticity estimates are found between high-income taxpayers and low- and middle-income taxpayers. This result suggests that, contrary to the general belief, taxpayers in low- and middle-income classes are as sensitive to tax incentives in making their contribution decisions as those in high-income classes. These findings have an important tax policy implication regarding extending the deductibility of charitable contributions to nonitemizers of which the majority are low- and middle-income taxpayers.

A high price elasticity estimate has been interpreted as implying high responsiveness of giving to the price change arising from the deductions for charitable contributions. On the contrary, the null hypothesis of low price elasticity of giving is not rejected for the nonitemizers model. The study finds substantially higher price elasticity estimates for itemizers, but insignificant positive estimates for nonitemizers. It may be tempting to make conclusions, based on the results, about the non-responsiveness of nonitemizers to the incentive for charitable contributions. Hence, the results require more prudent interpretation. It is highly likely that the price elasticity estimate is contaminated by unusual giving behavior of borderline nonitemizers. The presence of this new breed of taxpayers created by ERTA '81 is viewed as playing a pivotal role in estimating a positive value of price elasticity with a high standard error for nonitemizers and, in turn, as being responsible for the statistically significant difference in giving behavior between itemizers and nonitemizers.

The test results for the itemization effect based on the new definition shows that changes in itemization status significantly affected the demand for charitable contributions by a group of taxpayers during the ERTA years. This finding implies that lowering the zero bracket amount or setting a separate deduction floor for charitable contributions below the current standard deduction may induce more taxpayers to increase their giving because the number of taxpayers who face dual optima will increase as the deduction floor becomes lower. It is found that there are significant differences in parameter estimates between itemizers and nonitemizers. This finding suggests that the itemization effect is economically significant at aggregate levels and there is a structural difference in giving behavior between itemizers and nonitemizers. However, this finding of an itemization effect must be interpreted with caution because the sample of nonitemizers, which is a control group, includes borderline nonitemizers. As mentioned above, the nonitemizers' elasticity estimates are possibly contaminated by the unique and irregular giving behavior of borderline nonitemizers.

In sum, overall findings of this study generally indicate that the deduction policy regarding itemizers' contributions effectively attained its goal because itemizers are found to be sensitive to tax incentives in making their contribution decisions regardless of income class. However, deductions for nonitemizers' giving provided a windfall tax benefit to nonitemizers and induced many high-income taxpayers to switch their itemization status to nonitemizers.

The results of this study are important and useful for the following reasons. First, the mixed results of previous empirical studies, that left considerable uncertainty in this area of research, may be attributable to the differences in model specifications, estimation techniques, and ways of measuring variables. This study provides for a reconciliation of these differences by employing more precise information about charitable contribution deductions claimed by low- and middle-income taxpayers and by using more refined statistical tools.

Second, given that the objective of a tax policy that allows a deduction for charitable contributions is to encourage donations among taxpayers by providing them with tax incentives to donate, this study provides evidence as to the propriety of the tax policy regarding nonitemizers' charitable contributions by evaluating the results of Congress' experiment with actual tax return data. Particularly, the results of this study on the price elasticity of giving will give an insight into whether the policy goal behind extending the deductibility of contributions to nonitemizers was attained. Since the giving behavior of taxpayers in the low- and middle-income classes and particularly among nonitemizers is unclear, the identification of differences in responsiveness between taxpayers in different income classes and between itemizers and nonitemizers provides a further step toward the establishment of an efficient and consistent tax policy regarding charitable contributions.

6.3 Limitations and Future Research

The conclusions of the study are subject to several limitations. As discussed in Chapter 5, the presence of borderline nonitemizers may cause biased elasticity estimates. To our chagrin, however, the lack of information on nonitemizers' noncontribution expenditures precludes one from identifying this group of taxpayers in the tax returns. This bias may be substantially alleviated by using survey data.

Although the model developed in this study explicitly incorporates the endogeneity of the price variable in the limited dependent model, endogeneity problems still exist on the part of itemization. Constructing a model for a consistent estimation of price elasticity in the presence of the endogenous itemization decision is a desirable extension of this research.

The assumption implicit in the model used in the study is that the income and price elasticities are constant. The validity of the assumption of constant elasticities has frequently been challenged for its restrictiveness (e.g., Brittain [1981, p. 443]). Alternative models have been suggested and estimated in several studies to alleviate this problem (Feldstein and Taylor [1976], Clotfelter and Steuerle [1981]). Although no firm conclusion is provided regarding the superiority of alternative models, the varying elasticity specification seems worth incorporating into the Simultaneous Equations Tobit model in a future study.

Charities are assumed to be passive recipients that are exogenous to models of individuals' giving behavior. This assumption may not necessarily be valid since charities are usually engaged in extensive fund-raising activities. The incorporation of charities' fund-raising activities into the model would provide a good opportunity for future research.

The model rests on the assumption that labor supply is constant and making contributions increases an individual's utility. The behavior of donors who may choose the timing of making a contribution to reduce their tax liability by bunching when they face different tax rates or deduction limits for different years is not explicitly considered in the models. Donors may tend to overstate contributions in their tax returns and this tendency may vary by itemization status and tax rate. Difference in estimates between using survey data and tax return data also needs to be explained in future studies.

It is possible that there are omitted variables that may add an important source of variation such as state income taxes, home ownership, income averaging, alternative minimum tax, and a crowding-out effect of government's expenditures. Future research should focus on finding a rigorous model to guide the choice of variable.

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Appendix
Alternative Formula for the Price of Giving

Under the 1984 and 1985 tax laws, gifts of appreciated property are generally deductible at full market value, depending on the type of asset. In addition, the appreciated portion in value itself is not subject to the capital gains tax. This added tax incentive leads to modifying the basic formula for the price of giving as follows:

(i) $P_a = 1 - \tau - \tau_{cg} r$,

where P_a is the net cost of contributing a dollar of appreciated assets, τ is the marginal tax rate on ordinary income which applies to the total market value of the asset whereas τ_{cg} is the capital gains tax rate which applies to the appreciated portion, and r is the proportion of capital gains potential in the asset's market value when the asset is contributed. For nonitemizers, equation (i) will be analogously modified.

Taking into account the deferral of capital gain and the possibility of never realizing gain, Feldstein [1975] and Feldstein and Clotfelter [1976] used the ratio of 0.5

for the value of "r". Hence, for a charitable donor who contributes both cash and appreciated property, the price of giving is defined as a weighted average of the price of making cash gifts and the price of giving appreciated assets:

(ii) $P = q * P_c + (1 - q)*P_a,$

where q is the proportion of gifts made in cash and P_c is the price of cash giving. Combining equation (i) and (ii),

(iii) $P = q(1 - \tau) + (1 - q)(1 - \tau - 0.5\tau_{cg}).$

However, by repealing the deduction of 60% of net long-term capital gains, TRA '86 substantially reduced incentives for the gifts of appreciated property. For the post-1986 price of giving, therefore, this tax law change must be taken into consideration.

BIOGRAPHICAL SKETCH

Yong Sun Choe was born in Seoul, Korea, on March 2, 1946, the son of Jae-Jin Choe and Kyu-Joo Song. Yong married Young-Ae Kim on February 2, 1975 and has two sons, Ho-Joon (Eric) and Joon-Min (Steve). After graduating from Jemulpo High School in Incheon, Korea, he attended Yonsei University in Seoul where he received his Bachelor of Arts degree in political science in 1974. He served in the Korean Army from 1966 to 1969, including one year in Vietnam. From 1973 to 1976 he was employed as an administrator and later as a staff internal auditor by YuHan Corporation in Seoul. In 1976, he joined Daewoo Corporation. Yong retired from Daewoo as a manager of the personnel department in 1979, taking a position as a managing director at a transportation company, one of his family's businesses.

Yong entered the Graduate School of Business at the University of Texas at Austin (UT) in 1981 to pursue graduate studies in accounting. In 1983, he completed the Master in Professional Accounting degree at UT. In 1984, Yong entered the University of Florida as a graduate student in accounting. As the time of this writing, he anticipates a doctoral degree in May of 1990. He has accepted a position as Assistant Professor of Accounting and Taxation at the Florida International University to begin in the fall of 1989.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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